

SONY®

VIDEOCASSETTE PLAYER

BVU-900

Professional **U**-matic **SP**

MAINTENANCE MANUAL

Volume 1 1st Edition

Serial No.10001 and Higher

SONY®

VIDEOCASSETTE PLAYER

BVU-900



Professional **U-matic** **SP**
MAINTENANCE MANUAL
Volume 1 1st Edition
Serial No.10001 and Higher

Warning—This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart J of Part 15 of FCC Rules.

このマニュアルに記載されている事柄の著作権は当社にあり、説明内容は機器購入者の使用を目的としています。従って、当社の許可なしに無断で複写したり、説明内容(操作、保守等)と異なる目的で本マニュアルを使用することを禁止します

The material contained in this manual consists of information that is the property of Sony Corporation and is intended solely for use by the purchasers of the equipment described in this manual.

Sony Corporation expressly prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation or maintenance of the equipment described in this manual without the express written permission of Sony Corporation.

Le matériel contenu dans ce manuel consiste en informations qui sont la propriété de Sony Corporation et sont destinées exclusivement à l'usage des acquéreurs de l'équipement décrit dans ce manuel.

Sony Corporation interdit formellement la copie de quelque partie que ce soit de ce manuel ou son emploi pour tout autre but que des opérations ou entretiens de l'équipement à moins d'une permission écrite de Sony Corporation.

Das in dieser Anleitung enthaltene Material besteht aus Informationen, die Eigentum der Sony Corporation sind, und ausschließlich zum Gebrauch durch den Käufer der in dieser Anleitung beschriebenen Ausrüstung bestimmt sind.

Die Sony Corporation untersagt ausdrücklich die Vervielfältigung jeglicher Teile dieser Anleitung oder den Gebrauch derselben für irgendeinen anderen Zweck als die Bedienung oder Wartung der in dieser Anleitung beschriebenen Ausrüstung ohne ausdrückliche schriftliche Erlaubnis der Sony Corporation.

TABLE OF CONTENTS

1. INSTALLATION

1-1. Operational Environment	1-1
1-2. Installation Space	1-1
1-3. Input/Output Signal of the Connector	1-2
1-4. Connection Connector	1-4
1-5. Select Switch Setting	1-4
1-6. Dial Menu Operation	1-6
1-6-1. Button and Dial Settings	1-6
1-6-2. Operation	1-6
1-6-3. ITEM/DATA	1-9
1-6-4. System Error	1-16
1-7. Display of Time Code Character and Title	1-18
1-7-1. Setting the Time Code Character and the Title	1-18
1-7-2. Insert the Characters on the Playback Picture	1-23
1-8. Rack Mounting	1-24
1-9. Function Control Panel Positioning	1-27
1-10. Use of the Function Control Panel as a Remote Control Unit	1-27
1-11. REMOTE 2 (24P) Connector	1-28
1-12. Supplied Accessories	1-28
1-13. Optional Accessories	1-29

2. TECHNICAL INFORMATION

2-1. Specifications	2-1
2-2. Location of Main Parts	2-3
2-2-1. Location of the Mechanical Main Parts/Components	2-3
2-2-2. Location of the Printed Circuit Boards	2-7
2-3. Printed Circuit Boards	2-11
2-4. Cassette Removal Procedure when Normal Ejection is not Possible	2-13
2-5. The Tape Speed and Time in FF and REW Mode	2-14
2-6. Mode Conversion Diagram and Timing Chart	2-16

3. PERIODIC CHECK AND MAINTENANCE

3-1. System Control Operation Check	3-1
3-1-1. Play Back, F.FWD, REW, SHUTTLE, JOG and Preroll Function Check	3-1
3-2. Hours Meter	3-4
3-3. Cleaning Procedure	3-4
3-3-1. Video Heads	3-4
3-3-2. Stationary Heads	3-4
3-3-3. Tape Movement Areas	3-4
3-4. Head Degaussing	3-4
3-5. Maintenance After Repairs	3-4
3-6. Periodic Check and Maintenance Schedule	3-5

4. SERVICE INFORMATION

4-1. Removal and Installation of the Cabinet ..	4-1
4-2. Removal and Installation of the Function Control Panel	4-3
4-3. Removal of the Cassette-up Compartment	4-3
4-4. Service of the Special Printed Circuit Boards	4-4
4-4-1. Replacement of Parts on the HN-80A Printed Circuit Board	4-4
4-4-2. Removal of the PD-45 Printed Circuit Board	4-4
4-4-3. Replacement of the MB-139 Printed Circuit Board	4-4
4-4-4. Removal of the DR-53 and DR-59 Printed Circuit Boards	4-5
4-5. Removal and Installation of the Power Block	4-6
4-6. Extension Board	4-7
4-7. Operation of the Unit Without Installing the Cassette-up Compartment and the Cassette Tape	4-6
4-8. Spare Parts	4-7
4-9. Fixture	4-8
4-10. Safety Check-out	4-9

5. REPLACEMENT OF MAJOR PARTS

5-1. Replacement of the Upper Drum Assembly	5-1
5-2. Replacement of the Drum Assembly	5-3
5-3. Replacement of the Capstan Motor	5-3
5-4. Replacement of the Reel Motor	5-4
5-5. Replacement of the Head	5-5
5-5-1. Replacement of the Audio/CTL Head	5-5
5-5-2. Replacement of the Time Code Head	5-6
5-6. Replacement of the Tension Detector Block	5-7
5-6-1. Replacement of the S Tension Detector	5-7
5-6-2. Replacement of the T Tension Detector	5-8
5-6-3. Replacement of the CdS of the S Tension Detector	5-9
5-6-4. Replacement of the CdS of the T Tension Detector	5-9
5-7. Replacement of the S Drawer Roller	5-10
5-8. Replacement of the Threading Ring System	5-10
5-8-1. Replacement of the Threading Ring ..	5-10
5-8-2. Replacement/Adjustment of the TG-5 and TG-6	5-11
5-8-3. Replacement/Adjustment of the Threading Roller	5-12
5-8-4. Replacement of the Pinch Roller	5-12

5-9.	Replacement of the Threading Gear Box System	5-13
5-9-1.	Replacement of the Threading Gear Box	5-13
5-9-2.	Replacement of the Threading Motor ..	5-14
5-9-3.	Replacement of the Threading Belt ..	5-15
5-10.	Replacement of the Reel Table Rotation Detector Block	5-15
5-11.	Replacement of the Pinch Solenoid	5-16
5-12.	Items to be Adjusted After Main Parts Replacement	5-17

6. LINK AND DRIVE SYSTEM ALIGNMENT

Alignment Information	6-1
6-1. Reel Table System Adjustment	6-2
6-1-1. Cassette Holder Position Adjustment ..	6-2
6-1-2. Reel Table Height Adjustment	6-3
6-1-3. Reel Motor Shaft Slantness Adjustment	6-4
6-2. T Drawer Arm Block Adjustment	6-5
6-2-1. T Drawer Arm EJECT Position Adjustment	6-5
6-2-2. Unthread End Switch Position Adjustment	6-6
6-3. S Tension Detector Adjustment	6-7
6-3-1. S Tension Detector Rollor Azimuth/Zenith Adjustment	6-7
6-3-2. S Tension Detector Operating Point Adjustment	6-8
6-4. T Tension Detector Adjustment	6-9
6-4-1. T Tension Detector Guide Height Adjustment	6-9
6-4-2. T Tension Detector Guide Oprating Position Adjustment	6-10
6-4-3. T Tension Detector Operating Point Adjustment	6-11
6-5. Threading System Adjustment	6-13
6-5-1. Threading Ring Rotation Adjustment ..	6-13
6-5-2. Gear Box Installing Position Adjustment	6-14
6-5-3. Pinch Rollor Self Alignment Adjustment	6-15
6-5-4. FR Detector Block Installing Position Adjustment	6-16
6-6. Pinch Lever Block Adjustment	6-17
6-6-1. Pinch Lever Preset Adjustment	6-17
6-6-2. Pinch Roller Preset Adjustment	6-18
6-6-3. Pinch Solenoid Installing Position Adjustment	6-19
6-6-4. Pinch Solenoid Block Position Adjustment	6-20
6-7. T Tape Sensor Position Adjustment	6-21
6-8. S Drawer Roller Block Limiter Adjustment	6-22

6-9.	Brake solenoid Position Adjustment	6-23
6-9-1.	T Brake Solenoid Position Adjustment	6-23
6-9-2.	S Brake Solenoid Position Adjustment ..	6-23
6-10.	Reel Table Rotation Detector Block Position Adjustment	6-24
6-11.	Cassette-up Compartment Adjustment	6-25
6-11-1.	Cassette-in Switch Position Adjustment ..	6-25
6-11-2.	Cassette-down Switch Position Adjustment	6-26
6-12.	Leaf Spring Position Adjustment	6-27

7. TORQUE SYSTEM ALIGNMENT

7-1.	S Brake Torque Adjustment	7-1
7-2.	T Brake Torque Adjustment	7-2
7-3.	Sub Brake Adjustment	7-3
7-3-1.	Sub Brake Torque Adjustment	7-3
7-3-2.	Sub Brake Release Adjustment	7-4
7-4.	Reel Motor Current Sensitive Adjustment ..	7-6
7-4-1.	S Reel Motor Current Sensitive Adjustment	7-6
7-4-2.	T Reel Motor Current Sensitive Adjustment	7-7
7-5.	FWD Back Tension Adjustment	7-8

8. TAPE RUN ALIGNMENT

8-1.	T Correction Guide Slantness Adjustment ..	8-1
8-2.	PLAY Mode Tape Path Adjustment (1) ..	8-2
8-3.	PLAY Mode Tape Path Adjustment (2) ..	8-3
8-4.	FF/REW Mode Tape Path Adjustment	8-4
8-5.	FWD×5/REV×5 Search Mode Tape Path Adjustment	8-5
8-6.	Audio Head Zenith Adjustment	8-6
8-7.	Time Code Head Adjustment	8-7
8-7-1.	Time Code Head Zenith Adjustment ..	8-7
8-7-2.	Time Code Head Azimuth Adjustment	8-8
8-7-3.	Time Code Head Head-to-tape Contact Adjustment	8-8
8-8.	Tracking Adjustment	8-9
8-8-1.	Video Tracking Adjustment	8-10
8-8-2.	Audio Head Height Adjustment	8-13
8-8-3.	Audio Head Azimuth Adjustment	8-14
8-8-4.	Audio Head Phase Adjustment	8-14
8-8-5.	Audio/CTL Head Position Adjustment ..	8-15
8-8-6.	Time Code Head Height Adjustment ..	8-16
8-8-7.	Time Code Head Position Adjustment ..	8-17
8-8-8.	Switching Position Adjustment	8-18
8-8-9.	Drum Phase Adjustment	8-19
8-9.	Video Head Dihedral Adjustment	8-21

9. POWER SUPPLY/SYSTEM CONTROL ALIGNMENT

- 9-1. DC Voltage Regulator (UR-21) Adjustment 9-1
- 9-2. Tape Sensor Balance Adjustment .. 9-2

10. SERVO SYSTEM ALIGNMENT

- 10-1. D/A Amplitude Adjustment 10-2
- 10-2. Vertical Sep EN Pulse Adjustment 10-2
- 10-3. Capstan FG Bias Adjustment 10-3
- 10-4. Drum Free Speed Adjustment 10-4
- 10-5. Tracking Control Adjustment..... 10-5
- 10-6. SKEW Control Adjustment..... 10-5
- 10-7. Reel FG Bias Adjustment 10-5
- 10-8. Capstan Free Speed Adjustment 10-6
- 10-9. Capstan Acceleration Compensation Adjustment 10-6
- 10-10. Tracking Control Center Adjustment 10-6
- 10-11. Picture Splitting Compensator Adjustment 10-7

11. AUDIO SYSTEM ALIGNMENT

- 11-1. Audio Level Setting 11-2
- 11-2. Audio Output Level Adjustment 11-2
- 11-3. Audio Monitor Output Level Adjustment 11-2
- 11-4. Frequency Response Adjustment 11-3
- 11-5. Audio Level Meter Adjustment 11-3
- 11-6. Spectral Skewing Adjustment..... 11-4
- 11-7. Pilot Tone Level Adjustment 11-4
- 11-8. Pilot Tone Phase Adjustment 11-5
- 11-9. Pilot Tone Detect DC Balance Adjustment 11-5
- 11-10. Dolby Detect Level Adjustment 11-5
- 11-11. Dolby Detect Inhibit Adjustment 11-6

12. VIDEO SYSTEM ALIGNMENT

- 12-1. RF Frequency Response Adjustment (1) 12-2
- 12-2. Dropout Compensation Sensitivity Adjustment 12-3
- 12-3. RF Amplifier DC Balance Adjustment 12-4
- 12-4. RF Frequency Response Adjustment (2) 12-4
- 12-5. Y RF Output Balance Adjustment .. 12-5
- 12-6. Y RF Output Level Adjustment 12-5
- 12-7. Chroma RF Balance Adjustment 12-5

- 12-8. Chroma RF Level Adjustment 12-6
- 12-9. Carrier Balance Adjustment 12-6
- 12-10. SP Mode Detection Adjustment 12-7
- 12-11. Demodulator Y Phase Equalizing Adjustment (SP Mode) 12-7
- 12-12. Phase Equalizing Tentative Adjustment (Conventional Mode) 12-8
- 12-13. DUB Y Frequency Response Adjustment (SP Mode) 12-8
- 12-14. DUB Y Frequency Response Adjustment (Conventional Mode) 12-9
- 12-15. Y Output Level Adjustment (SP Mode) 12-9
- 12-16. Y Output Level Adjustment (Conventional Mode) 12-10
- 12-17. DOC Offset/Level Adjustment 12-10
- 12-18. Phase Equalizing Adjustment (Conventional Mode) 12-11
- 12-19. SP/CONV DC Shift Adjustment 12-11
- 12-20. SP/CONV DC Balance Adjustment.. 12-11
- 12-21. VCO DC Level Adjustment 12-12
- 12-22. Reference Oscillation Adjustment 12-12
- 12-23. 4.27MHz Level Adjustment 12-12
- 12-24. ACC Burst Gate Adjustment 12-12
- 12-25. APC Burst Gate Adjustment 12-13
- 12-26. ACC Level Adjustment (1) 12-15
- 12-27. DG Compensation Tentative Adjustment 12-15
- 12-28. Converter Balance Adjustment 12-16
- 12-29. ACC Level Adjustment (2) 12-16
- 12-30. DUB Chroma Level Adjustment 12-16
- 12-31. TBC Chroma Output Level Adjustment 12-17
- 12-32. High-Speed ACC Adjustment (1) 12-17
- 12-33. High-Speed ACC Adjustment (2) 12-18
- 12-34. Chroma Noise Canceller Adjustment 12-18
- 12-35. TBC Y Output Level Adjustment .. 12-19
- 12-36. Y/C Delay Adjustment (SP Mode).... 12-19
- 12-37. Y/C Delay Adjustment (Conventional Mode) 12-20
- 12-38. Y/C Delay DUB Adjustment (SP Mode) 12-20
- 12-39. DG Compensation Adjustment 12-21
- 12-40. Y/C Mixing Adjustment 12-22
- 12-41. Time Code Gate Pulse Level Adjustment 12-23
- 12-42. Tracking Meter Adjustment 12-23
- 12-43. O.A Y RF Output Level Adjustment 12-24
- 12-44. Y Noise Canceller Adjustment 12-24
- 12-45. Y Phase Equalize Adjustment 12-25
- 12-46. Y Frequency Response Adjustment .. 12-25
- 12-47. Character Mix Adjustment 12-26

13. TIME CODE SYSTEM ALIGNMENT AND OTHERS

- 13-1. TC PB Level Adjustment 13-1
- 13-2. Character Size Adjustment 13-2

Volume-2

14. BLOCK DIAGRAMS

15. SEMICONDUCTOR ELECTRODES

16. SCHEMATIC DIAGRAMS

17. PRINTED CIRCUIT BOARDS

18. SPARE PARTS AND FIXTURE

SECTION 1 INSTALLATION

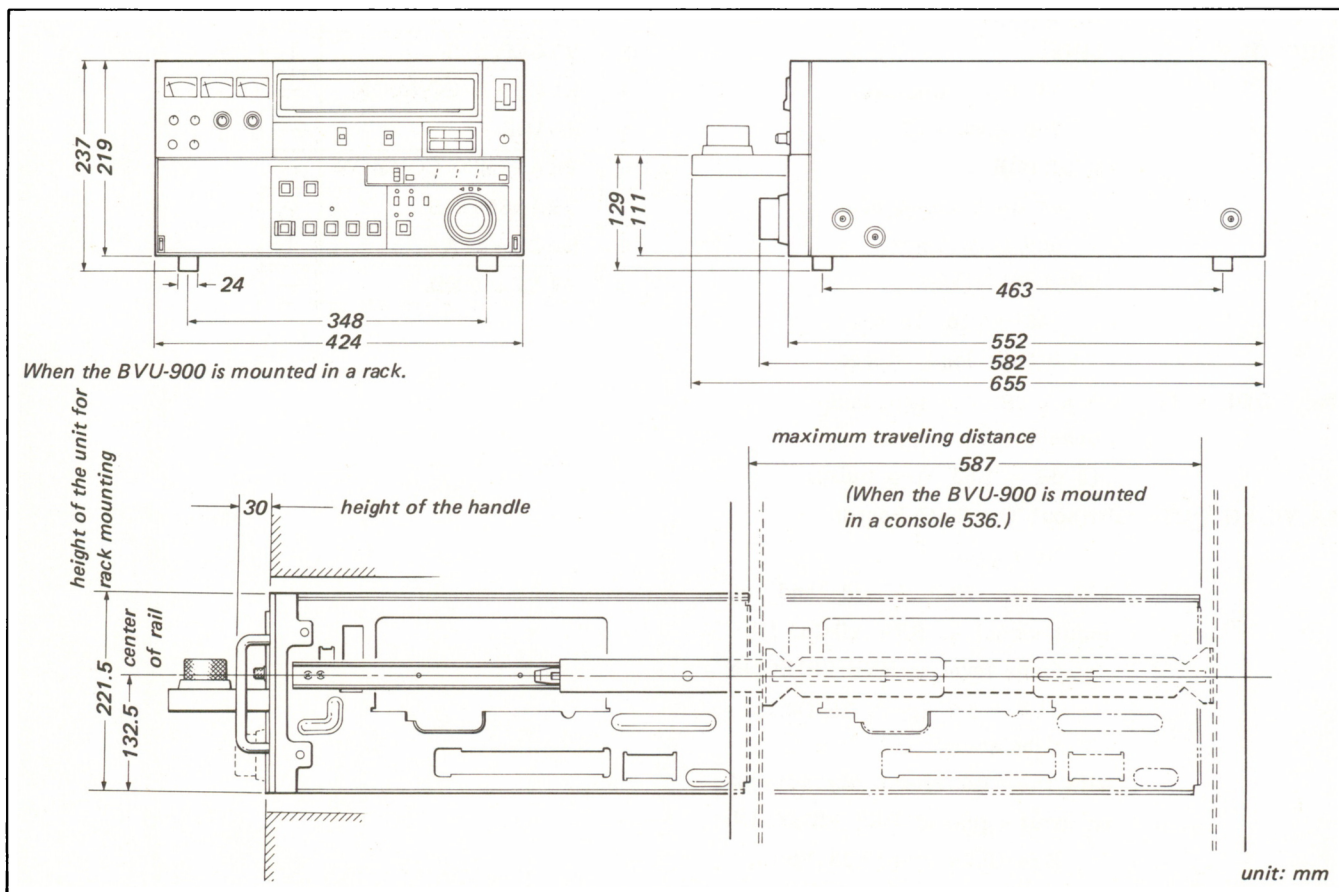
Ensure that the BVU-900 is installed in an area which has a working environment as described below. Only in this way can you be assured that the superior performance of the unit, together with ease of access for maintenance, will be maintained.

1-1. OPERATIONAL ENVIRONMENT

- . Avoid areas where the BVU-900 will be exposed to direct sunlight, or other strong direct lights.
- . Avoid installation in dusty areas or areas where it will be subject to vibration.
- . Avoid areas where strong electric or magnetic fields are to be found.
- . To prevent overheating of the BVU-900, ensure that there is good air circulation around the unit. Ensure that the ventilation holes in the top and rear panels are not blocked.
- . Avoid installation in a location near heat sources. The unit should only be operated in a temperature range from 5 C to 40 C.

1-2. INSTALLATION SPACE

- . The dimensions of the unit are shown in the figure below.
- . The rear of the unit must be at least 40 cm away from the wall for ventilation and maintenance.
- . If the BVU-900 is operated on a desk or in a similar environment, ensure that the vertical clearance above the unit is at least 40 cm to allow for easy access to the printed circuit boards and mechanical parts. This space is not necessary if the unit is mounted in a 19-inch rack or console because the printed circuit boards can be repaired after the unit is pulled out.



1-3. INPUT/OUTPUT SIGNAL OF THE CONNECTOR

The input and output signals of the main connectors on the connector panel are as follows:

INPUT

REF VIDEO IN : 1.0 ± 0.2 Vp-p, 75 Ohms,
unbalanced
(EXT SYNC IN : 0.2 Vp-p to 5 Vp-p, negative,
75 Ohms, unbalanced)
SC IN : $2 + 1, - 1.5$ Vp-p, 75 Ohms,
unbalanced

OUTPUT

VIDEO OUT 1/2 : 1.0 ± 0.2 Vp-p, sync negative,
75 Ohms, unbalanced
DUB OUT : Luminance signal:
 1.7 ± 0.2 Vp-p,
sync negative,
impedance 50 Ohms ± 10 %
Chroma signal:
 0.9 ± 0.1 Vp-p,
impedance 50 Ohms ± 10 %
RF (OFF TAPE) : 0.5 Vp-p, 75 Ohms,
unbalanced
AUDIO OUT : LINE:
+4 dBm, balanced,
600 Ohm load
MONITOR:
+4 dBm, balanced,
600 Ohm load
HEADPHONES:
-46 dB to -26 dB,
8 Ohm load, stereo
TIME CODE OUT : 0 ± 3 dB, low impedance,
unbalanced
(0 dB = 1.55 Vp-p pulse)
REF VIDEO OUT : Without the TBC Board:
No output
With the TBC Board and an
input signal at REF VIDEO IN:
Same level as REF VIDEO IN
(1.0 ± 0.2 Vp-p), 75 Ohms,
unbalanced
With the TBC Board, but without
an input signal at REF VIDEO IN:
B.S. (0.28 Vp-p/ 0.28 Vp-p),
75 Ohms, unbalanced

MONITOR

VIDEO : 1.0 ± 0.2 Vp-p, sync negative,
75 Ohms, unbalanced

8P

Pin	I/O Signal
1	AUDIO MONITOR OUT (X)
2	VIDEO OUT (X)
3	NC
4	NC
5	AUDIO MONITOR OUT (G)
6	VIDEO OUT (G)
7	NC
8	NC

REMOTE CONTROL

REMOTE 1 (9P)

Pin	Description	I/O
1	FRAME GND	—
2	TRANSMIT A	O
3	RECEIVE B	I
4	RECEIVE COMMON	—
5	SPARE	—
6	TRANSMIT COMMON	—
7	TRANSMIT B	O
8	RECEIVE A	I
9	FRAME GND	—

REMOTE 2 (24P)

Pin	I/O Signal	Specification
1	+5 V OUT	MAX. 100 mA
2	L-STOP COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
3	L-F FWD COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
4	L-PLAY COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
5	L-REW COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
6	L-STANDBY COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
7	L-EJECT COMMAND IN	L: less than 1.5 V, H: more than 3.5 V, pulse width is more than 50 msec.
8	NC	
9	L-STOP STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
10	L-F FWD STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
11	L-PLAY STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
12	L-REW STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
13	L-STANDBY STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
14	L-CASSETTE IN STATUS OUT	L: 0.8 V (less than 8 mA), H: 4.7 k Ohms pullup resistor
15	NC	
16	NC	
17	NC	
18	NC	
19	NC	
20	NC	
21	NC	
22	NC	
23	NC	
24	GND	

TBC REMOTE

Pin	I/O Signal
1	SYNC CONTROL IN
2	HUE CONTROL IN
3	SC CONTROL IN
4	VIDEO LEVEL CONTROL IN
5	SET UP CONTROL IN
6	CHROMA LEVEL CONTROL IN
7	-12 V OUT
8	GND
9	FRAME GND
10	NC
11	NC
12	NC
13	NC
14	NC
15	+12 V OUT

1-4. CONNECTION CONNECTOR

When external cables are connected to various connectors on the BVU-900 connector panel during installation or maintenance, the hardware listed below (or equivalent) must be used.

Panel Indication	Connector
REF VIDEO IN SC IN VIDEO OUT 1/2 RF (OFF TAPE) REF VIDEO OUT MONITOR VIDEO	1-560-069-11 PLUG, BNC, MALE
TIME CODE	1-560-069-11 PLUG, BNC, MALE
DUB OUT	1-508-948-00 PLUG, 7P, MALE
AUDIO OUT	1-508-083-00 CONNECTOR, 3P, FEMALE
MONITOR	1-506-161-00 CONNECTOR, 8P, MALE
TBC REMOTE	1-508-495-00 PLUG, 9P, MALE
REMOTE 1	1-560-651-00 PLUG, 9P(M) and 1-561-749-00 JUNCTION SHELL, 9P
REMOTE 2	1-506-897-11 CONNECTOR, 24P, MALE

1-5. SELECT SWITCH SETTING

Along with the select switches on the control panel and the connector panel, the switches listed below are on the circuit boards. These switches must be set according to operating conditions.

. DM-54A Board

(i) S501: APC Switch

When the tape dubbed by VTR without capstan servo system is played back by BVU-900, the picture is sometimes not colored because of unusual APC fluctuations. This switch can widen APC lockrange so as to obtain the colored picture.

ON: WIDE (widen APC lock-range)

OFF: NORMAL

When the unit is shipped, this switch is set to the OFF position.

If this switch is set to the ON position, the colored picture cannot obtain sometimes in search mode. This switch should be turned to the OFF position in the normal use.

(ii) S301

When the SP format video signal and Conventional format video signal are recorded with mixed on the SP cassette, unstabilized picture may be appear at the SP/CONV switching points in the STILL and SEARCH modes (less than x1.2).

If improve this unstabilized picture in the STILL and SEARCH modes, this switch is set to OFF position.

When the unit is shipped, this switch is set to ON position.

. SV-88C Board

There are two switches, S201 and S202 on the SV-88C Board and they are closely related.

(i) S201 Bit7: ON

Bit8: OFF

S202: OFF

A emergency circuit for reel stop, tape slack, capstan error, drum stop and so on is not functioned in this mode. This mode is used in the mechanical alignment.

This mode is not set at the same time as the following items (ii) and (iii).

(ii) S201 Bit7: ON

Bit8: OFF

S202: ON

Set this mode, when operate the unit without installing the Cassette-up Compartment and cassette tape for the mechanical alignment.

This mode is not set at the same time as the items (i) and (iii).

(iii) S201 Bit 7: OFF

Bit 8: ON

S202: OFF

This mode release the H-lock mode.

This mode is not set at the same time as the above items (i) and (ii).

(iv) S201 Bit5: ON

Bit6: ON

S202: ON

This mode is set for the sensitive alignment of the reel torque without the cassette tape.

(v) S201 Bit3: ON

Bit4: OFF

S202: OFF

Set this mode, when the tape without recording the CTL signal is played back, the capstan rotate under the same state as recorded.

(vi) S201 Bit1: OFF

Bit2: ON

S202: OFF

This mode cancel the function of phi-square circuit.

When the unit is shipped, all switches, S201 and S202 are set to the OFF positions.

1-6. DIAL MENU OPERATION

Various select switches are provided on the Front Panel and printed circuit board (refer to Section 1-5 "Select Switch Setting"). The system controls (Still Timer, Preroll Time, etc.) initially set at the factory can be arbitrarily modified using the SEARCH dial, MENU button, DATA button, and SET button as in Section 1-5 Select Switch Setting.

The dial menu has the following functions:

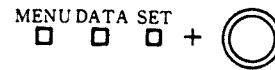
- . BASIC FUNCTION
- . ENHANCED FUNCTION

1-6-1. Button and Dial Settings

Search dial: Selects the ITEM, Modifies the DATA, Moves the cursor.

MENU button: Selects the ITEM when used with a search dial.

DATA button: Selects the DATA when used with a search dial.



1-6-2. Operation

Put the unit into DIAL MENU operation mode

The DIAL MENU operation data appears on the Front Panel's time counter display and monitor television (play back the recorded tape and the monitor television should be connected to the MONITOR OUT terminal on the Connector Panel).

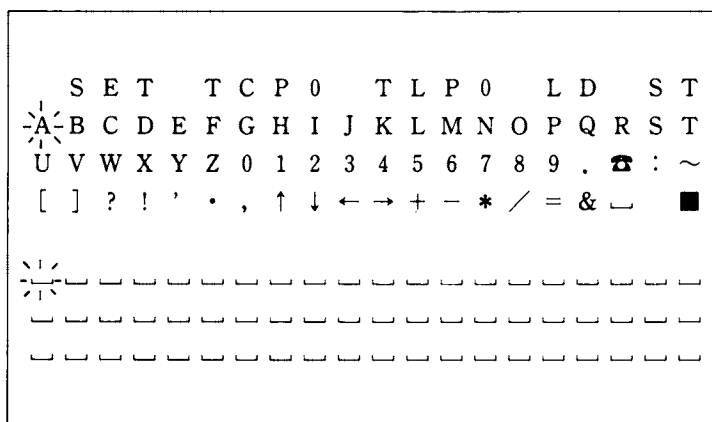
- (1) Set the REMOTE/LOCAL switch on the front panel to LOCAL.
- (2) Put the unit into JOG mode (when the SHUTTLE lamp is on, press the SEARCH dial).
- (3) Press the STOP button and put into the STOP mode.

- (4) Set the CTL/TC/DIAL MENU switch on the Front Panel to DIAL MENU.
The unit is put into the DIAL MENU mode and the ◁◻▷ lamp at the top of the SEARCH dial lights.

time counter



Monitor



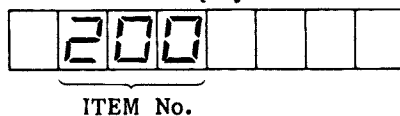
⋆ indicate the cursor

(NOTE) The VTR cannot be operated normally in the DIAL MENU operation mode.

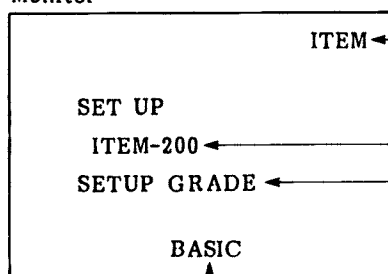
◁Select the ITEM>

- (5) Turn the search dial while pressing the MENU button.

time counter display



Monitor



MENU



ITEM ← Displayed while the MENU button is pressed.

SET UP

ITEM-200

SETUP GRADE

BASIC

ITEM No.

ITEM contents

When the SEARCH dial is turned, the ITEM No. and contents are changed.

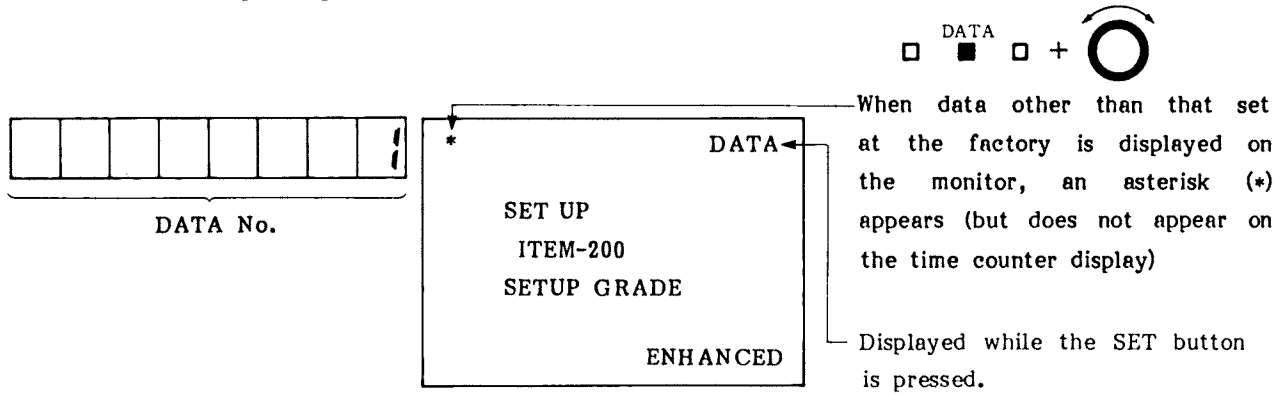
DATA contents } The data corresponding to the ITEM No. are displayed.

(6) Stop the dial when the desired ITEM is displayed, and then release the MENU button.

When the DATA No. on the time counter display and DATA contents on the monitor blink, they can be modified as following method.

◁Modify the data▷

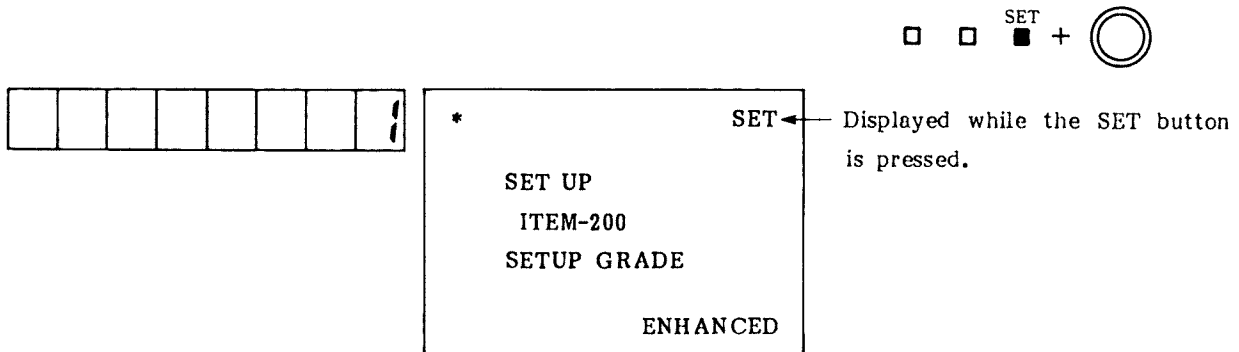
(7) Turn the dial while pressing the DATA button.



(8) Stop the dial when the desired data is displayed, and release the DATA button.

◁Set the data▷

(9) Press the SET button.



- . The displayed data is written into the memory, the data remains unchanged even if the POWER switch is turned OFF.
- . if the updated data is set, the ◁□▷ lamp at the top of the SEARCH dial flashes for one second when the SET button is pressed. The DATA No. and DATA content blinking stops at that time.

1-6-3. ITEM/DATA

(1) BASIC FUNCTION

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
103	TITLE (SMALL)	-----		The time code character and title are set in a small letter (for details, refer to Section 1-7).
104	TITLE (LARGE)	-----		The time code character and title are set in a capital letter (for details, refer to Section 1-7).
200	SETUP GRADE	0 1	BASIC ENHANCED	DATA No.0 BASIC: Enable to select ITEM from 101 to 200 in the DIAL MENU operation. DATA No.1 ENHANCED: Enable to select ITEM from 101 to 219 in the DIAL MENU operation. Factory setting: DATA No.0 (BASIC)

(2) ENHANCED FUNCTION

The ENHANCED FUNCTION can be used by setting data to ENHANCED in the ITEM No. 200.

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
201	ERROR STATUS	Error 01 Error 02 Error 03 Error 04 Error 05 Error 10 Error 20 Error 30	REEL STOP TAPE SLACK CAPSTAN ERROR DRUM STOP REEL ERROR HUMID SYSTEM ERROR SENSOR ERROR	Self-diagnostic function. When trouble occurs during normal operation, message "ERROR CODE" appears on the Front Panel's time counter display in any mode. When the unit is put into the DIAL MENU mode to select this ITEM, error status corresponding to the error code are displayed on the monitor. (Refer to Section 1-6-4 for further details.) Note: The ITEM data content cannot be modified. Normal operation: -----(NONE)
205	HOUR METER (DRUM)	00000 15000H	00000H 15000H	Displays the rotation time of the upper drum. Head replacement can be detected at that time. Up to from 0H to 15000H can be displayed. Note: The ITEM data content cannot be modified.
206	HOUR METER	00000 15000	00000H 15000H	Displays the total time of the power on sequence. Up to from 0H to 15000H can be displayed. Note: The ITEM data content cannot be modified.

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
207	STILL TIMER	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15	0.5 SEC 1 SEC 5 SEC 10 SEC 20 SEC 30 SEC 40 SEC 50 SEC 1 MIN 2 MIN 3 MIN 4 MIN 5 MIN 6 MIN 7 MIN 8 MIN	The unit automatically enters the tape PROTECTION mode after it has been in the tape STOP (or STILL) mode for a fixed time to prevent the video head from clogging (to reduce the tape damage). This item sets the transition time of the tape STOP to tape PROTECTION mode. The time can be set from 0.5 seconds to 8 minutes. Factory setting: DATA No.15 (8 MIN)
208	TAPE PROTECTION MODE	0 1	STEP FWD STANDBY OFF	When the time in the SEARCH STILL mode set using ITEM No.207 passes, selects the mode setting. DATA No.0 STEP FWD: The tape is sent repeatedly for one second at 1/30 times normal speed in the forward direction. DATA No.1 STANDBY OFF: Enters the STANDBY OFF mode. Factory setting: DATA NO.0 (STEP FWD)

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
209	SELECTION FOR SEARCH DIAL ENABLE	0 1	DIAL DIRECT VIA SEARCH BUTTON	When the SEARCH dial is turned or the SEARCH button is pressed, the unit enters the SEARCH mode. This item sets entering the SEARCH mode. DATA No.0 DIAL DIRECT: When the SEARCH dial is turned, the unit enters the SEARCH mode from any mode other than REC/EDIT. DATA No.1 VIA SEARCH BUTTON: When the SEARCH button is pressed, the unit enters the SEARCH mode. Factory setting: DATA No.0 (DIAL DIRECT)
210	DRUM ROTATION IN STAND- BY OFF	0 1	OFF ON	Sets the drum status in the STANDBY OFF mode. DATA No.0 OFF: The drum rotation stops. DATA No.1 ON: The drum is rotated. Factory setting: DATA NO.0 (OFF)

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
211	TAPE TIMER DISPLAY	0 1	+/-12H 24H	Selects whether the CTL counter should be displayed by $\pm 12H$ or 24H. DATA No.0 $\pm 12H$: Displayed by $\pm 12H$. DATA No.1 24H: Displayed by 24H. Factory setting: DATA No.0 ($\pm 12H$)
214	PREROLL TIME	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15	0 SEC 1 SEC 2 SEC 3 SEC 4 SEC 5 SEC 6 SEC 7 SEC 8 SEC 9 SEC 10 SEC 11 SEC 12 SEC 13 SEC 14 SEC 15 SEC	Sets the preroll time during editing. The preroll time can be set from 0 to 15 seconds. Factory setting: DATA No.05 (5 SEC)

Item		Data		Item and Data Description
ITEM NO. time counter	ITEM content monitor display	DATA NO. time counter	DATA content monitor display	
*220	FREEZE MODE SW4,SW3 SW2,SW1			Selects the Freeze mode.
		SW4	1 0	unused
		SW3	1 0	unused
		SW2	1 0	BVR-55 Freeze SW Selection IN Point Auto Freeze SW Manual Freeze SW
		SW1	1 0	Selects the STANDBY OFF Freeze Mode.

*(NOTE) When using the Item 220 by BKU-902 and BVR-55, be careful of these matters.
(1) change of BKU-902 inner SW

	before change	after change
Ref. No	COR 301	COR 301
Jumper position	1	2

(2) Position of INT TBC Selector ; AUTO

1-6-4. System Error

When a trouble occurs during normal operation and an error code appears on the time counter display of the Front Panel, the error status corresponding to the error code is displayed on the monitor by selecting the Item No. 201 on the dial menu. The error cause can be learned at that time.

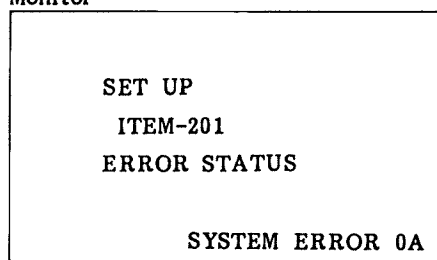
counter display	monitor display	Description
Error 01	REEL STOP	In the mode except the STOP and STILL modes, stop rotating the reel motor or direction error.
Error 02	TAPE SLACK	Excessive tape tension
Error 03	CAPSTAN ERROR	In the PLAY mode, speed over of the capstan or stopped it.
Error 04	DRUM STOP	When the drum rotation command is detected, the drum rotation stops.
Error 05	REEL ERROR	The tape runs in speed over.
Error 10	HUMID	The condensation
Error 20	SYSTEM ERROR	Mechanical error. Distinguished by the suberror code. (Refer to the following.)
Error 21	—————	RAM error when the POWER is ON.
Error 30	SENSOR ERROR	LED error of the T or S Tension Detector.
Error 90	—————	Communication error between SY board and KY board.
Error 99	—————	Lacking the 1/2 VD pulse to supply for the SY board.

(NOTE) Displayed on the time counter display about ERROR 21, 90 99.

When Error 20 "SYSTEM ERROR" appears, a suberror code is displayed at the lower right corner on the monitor.

The suberror code is described below.

Monitor



↑ Suberror code

The suberror code is a two-digit hexadecimal number. Assume that the high-order digit is called Error 1 and the low-order digit called Error 0.

Error 0

0.	Normal operation
1.	Entering the FR STOP mode from threading exceeds the prescribed time (seven seconds).
2.	Entering the THREAD END 2 mode from threading exceeds the prescribed time.
3.	Entering the UNTHREAD END mode from the THREAD END 2 mode during unthreading exceeds the prescribed time.
4.	Returning from the FR STOP mode to the CASSETTE DOWN position during unthreading exceeds the prescribed time.
5.	When a cassette is inserted and the EJECT button is pressed before the cassette-up compartment is lowered, raising the cassette exceeds the prescribed time.
6.	The initial correction of a tension sensor is not completed.
7.	No command is sent from the servo block to stop the SHORT FF/REW mode.
8.	No command is sent from the servo block to start the SHORT FF/REW mode.
9.	An error command is sent from the servo block in the SHORT FF/REW mode.
A.	No command is sent from the servo block to turn on the pinch solenoid.
B.	No command is sent from the servo block to turn off the pinch solenoid.
C.	No command is sent from the servo block to stop the FF/REW mode.
D.	The capstan motor is not rotated in reverse to enter the STANDBY OFF mode.
E.	The drum is not rotated to change the mode from STANDBY OFF to STANDBY ON.
F.	No command is sent from the servo block to start threading in the FR STOP mode.

Error 1

0.	Normal operation
1.	Microcomputer M2 is not interrupted by the signal eight times the frequency of the 1/2 VD pulse.
2.	Communication error between microcomputers M2 and AV.
3.	Communication error between microcomputers M2 and SV.
4.	Communication error between microcomputers M1 and M2.

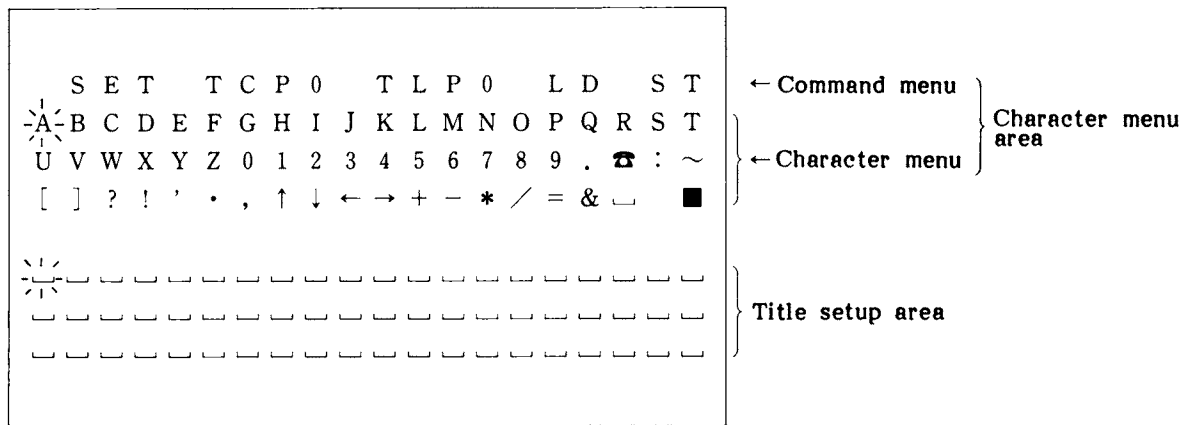
1-7. DISPLAY OF TIME CODE CHARACTER AND TITLE

BVU-900 can superimpose the time code character and the title on the picture in small or capital letter. Set the time code character and the title in the DIAL MENU operation.

1-7-1. Setting the Time Code Character and the Title

Display the setup picture

- . Connect the monitor TV to the MONITOR OUT terminal on the connector panel.
 - . Set the CHARACTER switch on the Sub-control Panel to ON.
1. Set the REMOTE/LOCAL switch to LOCAL.
 2. Put the unit into JOG mode.
 3. Press the STOP button and put the unit into STOP mode.
 4. Set the CTL/TC/DIAL MENU switch to DIAL MENU and put the unit into DIAL MENU mode.
 5. Turn the search dial on the Front Panel while pressing the MENU button. Select the ITEM No. 103 TITLE (SMALL).
 6. Release the MENU button. Display the setup picture on the monitor.



☎ indicate the cursor

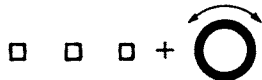
.The setup picture consist of characer menu area and title setup area.

.Chareter menu area: Select the character. Command menu in this area signify.

(Refer to steps 11 to 16.)

.Title setup area: Set the desired title.

(NOTE) Move the cursor in the character menu area

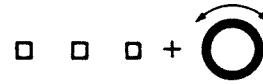
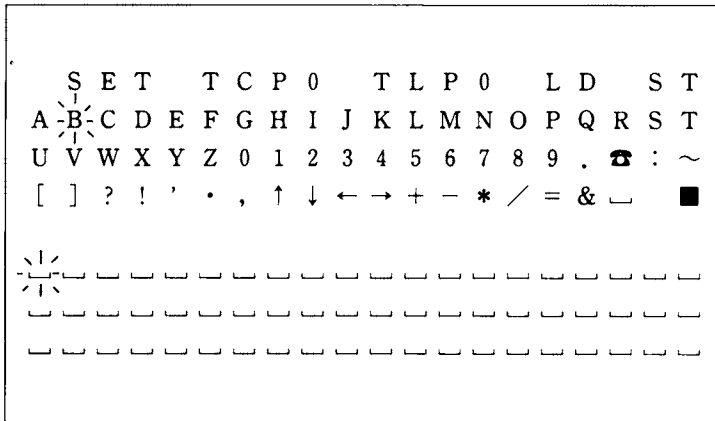


Move the cursor in the title setup area



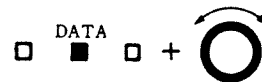
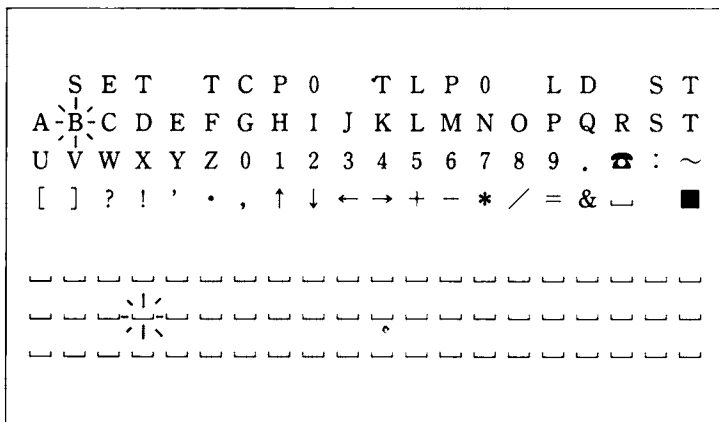
Setting the title

7. Turn the dial and move the cursor in the character menu area to the desired character.



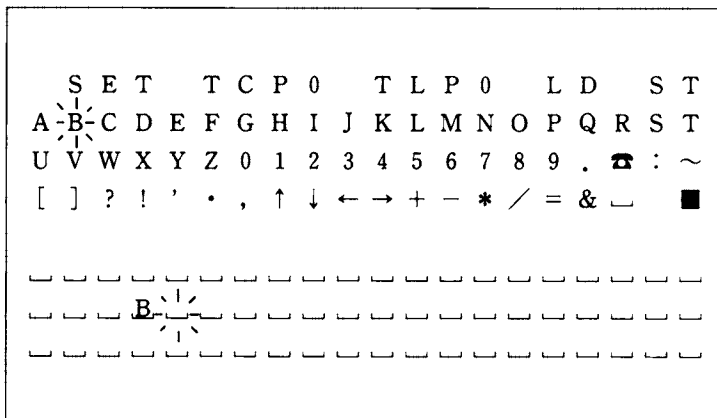
8. Turn the dial while pressing the DATA button.

Move the cursor in the title setup area to set the position where the character will be displayed.



9. Press the SET button on the Front Panel.

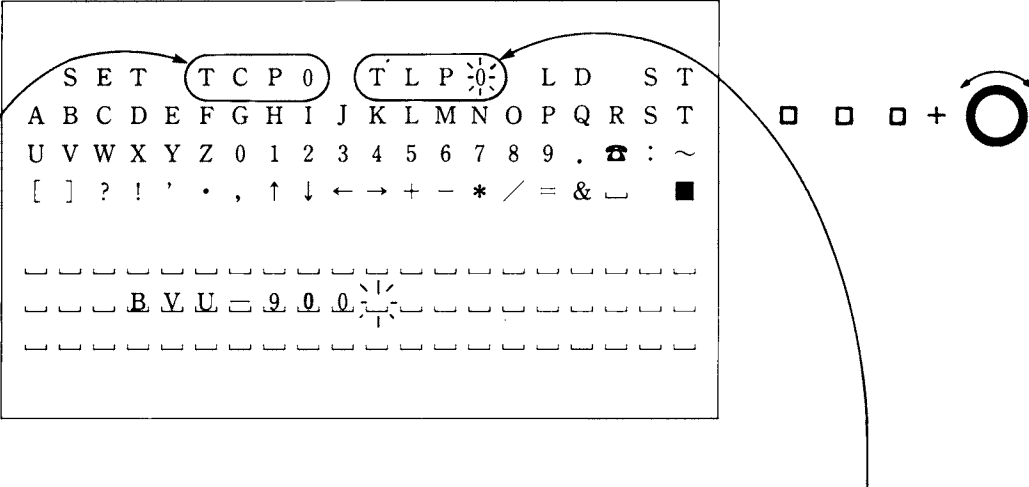
The appointed character in the character menu area is displayed at the blinking cursor in the title setup area. The cursor in the title setup area move to right by one character.



10. Repeat the steps 7 to 9 to set the title one by one.

Set the position of the time code and title characters

11. After the title setting is completed, turn the dial and move the cursor in the character menu area to TCP command or TLP command of the command menu.



TCP0

This set the position of the time code character on the display. (Time Code Position)

0 line to 9 lines.

(0 : not display the time code character)

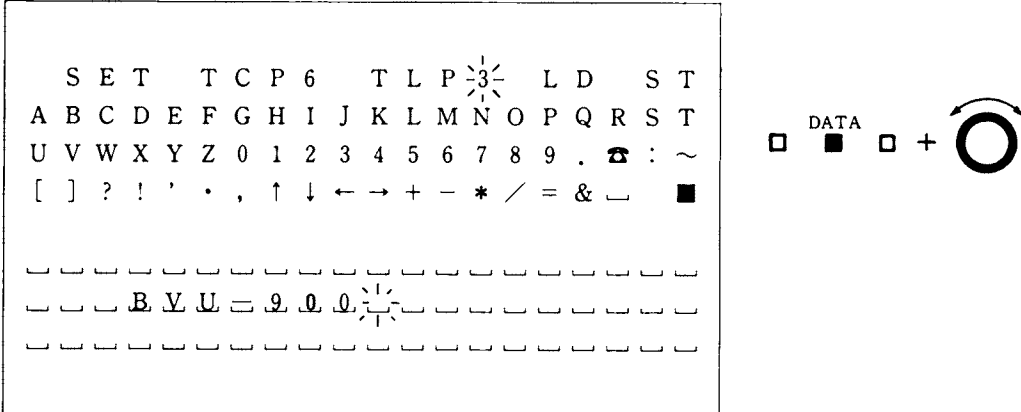
TLP0

This set the position of the title characters on the display. (Title character Position)

0 line to 7 lines.

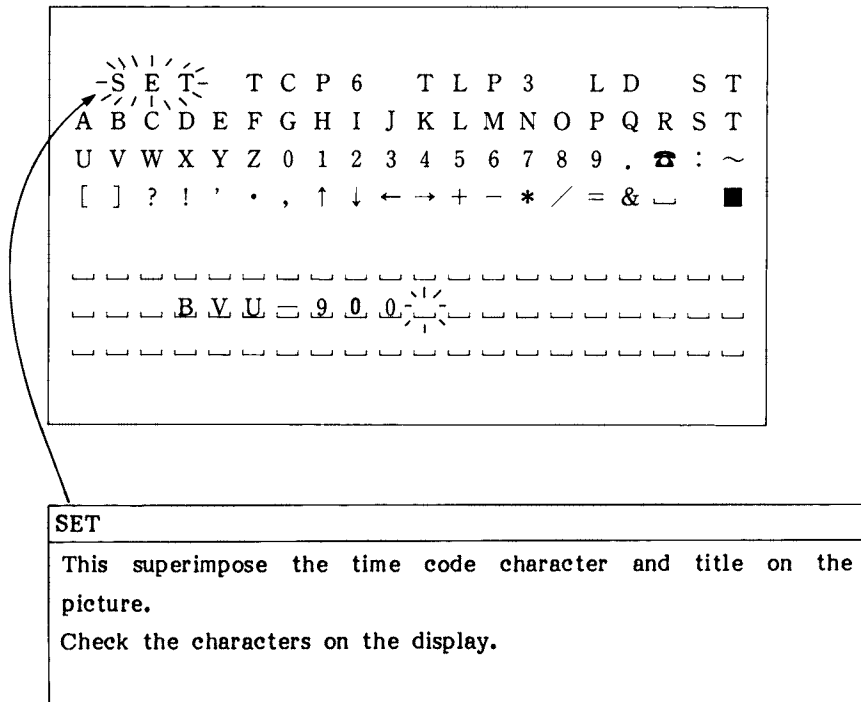
(0 : not display the title character)

12. Turn the dial while pressing the DATA button and set the position on the display for the characters.



Decision the title

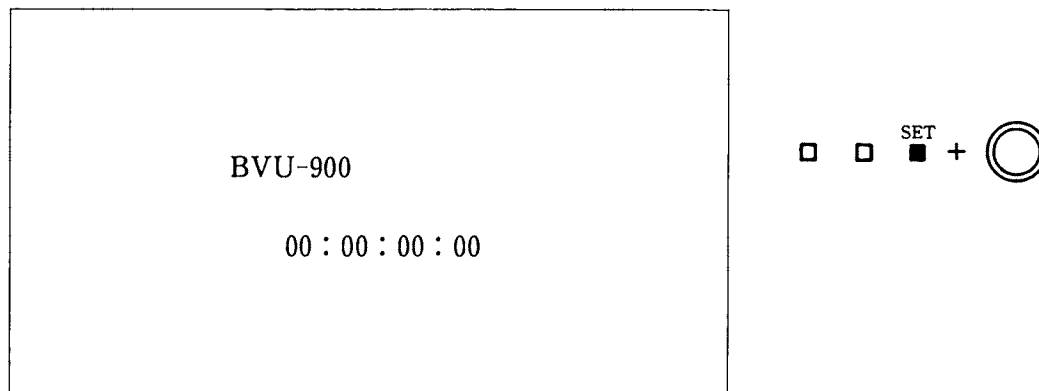
13. Turn the dial and move the cursor in the character menu area to SET command.



14. Press the SET button on the Front Panel.

The setup picture disappears, and the time code character and title are superimposed in the picture.

Then, complete the setting of the time code character and title.

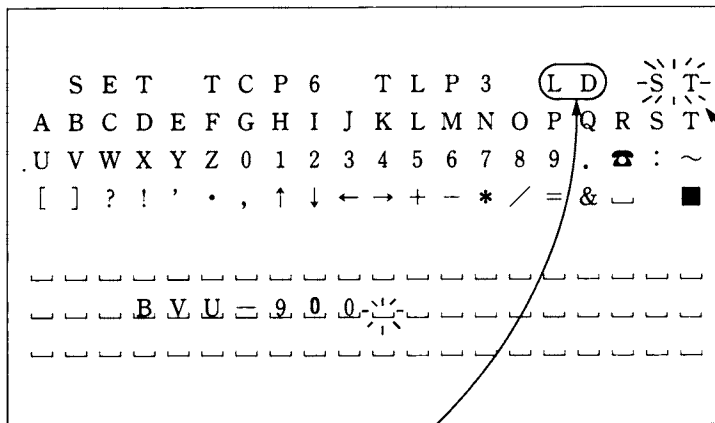


15. If press the SET button again or turn the dial, the setup picture will be displayed.

This enable to set once again.

Store and read-out the data

16. In the case of the title and TCP, TLP store in the memory, move the cursor in the character menu area to the ST command and press the SET button on the Front Panel.
- In the case of the stored data display in the setup picture, move the cursor to the LD command and press the SET button.



LD

This read-out and display the stored data in the setup picture.

ST

This store the title of the title setup area and TCP, TLP in the memory.

These data are memorized in the memory even if the POWER switch is turned OFF. (The old data are cleared.)

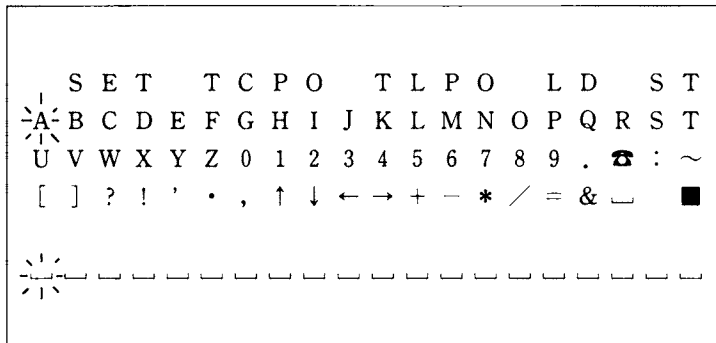
.When the data is stored once in the memory, these data can easily display on the setup picture by the following procedures.

1. Blink the LD command and press the SET button.
2. Blink the SET command and press the SET button.

(NOTE) 1. Setting of capital letters is performed by selecting the ITEM NO.104 TITLE (LARGE) in DIAL MENU.

The title setting and so on are the same procedures as above.

However, TCP and TLP can set from 0 to 5 lines.



2. If the title characters and time code characters are set to the same position, the title characters have priority.

1-7-2. Insert the Characters on the Playback Picture

1. Set the CTL/TC/DIAL MENU switch to CTL or TC.

The time code character and the title set in sec. 1-7-1 are superimposed on the picture.

(NOTE) If the characters are not superimposed when the CTL/TC/DIAL MENU switch is set to CTL or TC, check that the CHARACTER switch on the Subcontrol Panel is set to ON.

2. Press the PLAY button.

1-8. RACK MOUNTING

The BVU-900 can be rack-mounted in two ways.

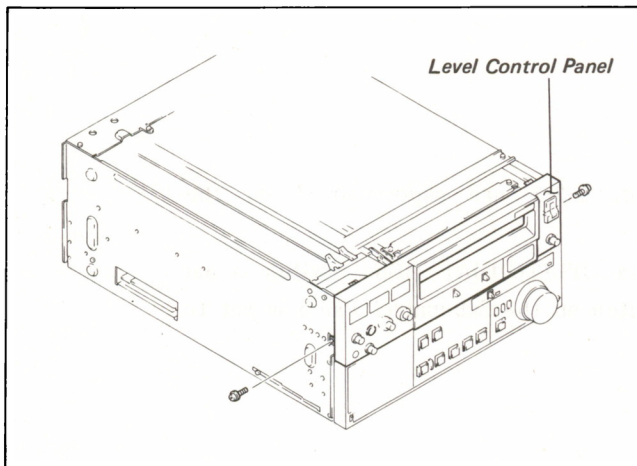
(1) Rack-mounting of the BVU-900 in a console.

It is recommended that a RMM-501 Rack Mount Kit be used. This is an optional accessory which includes the Slide Rails and the Handle Brackets. If an RMM-501 is not available, use the following ACCURIDE slide rail:

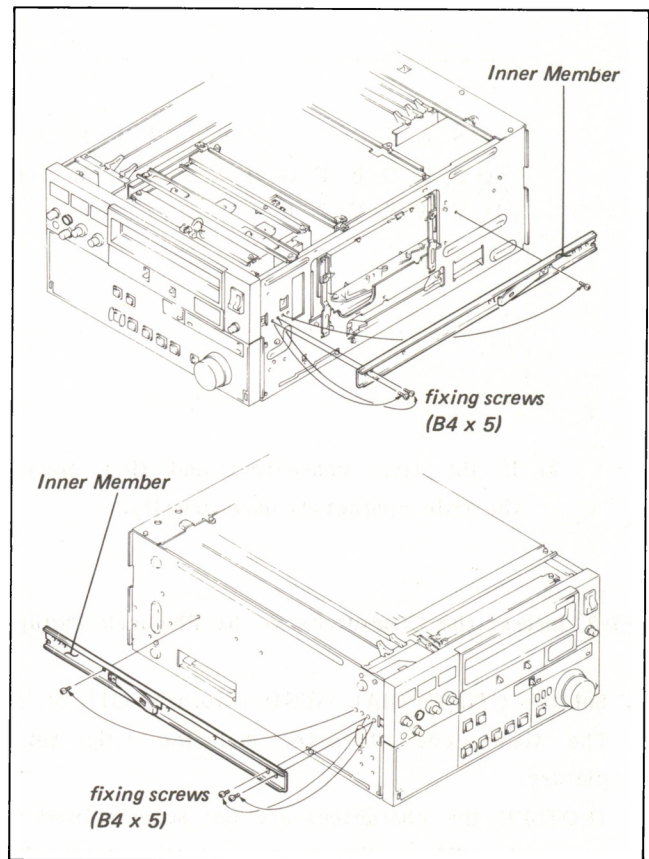
RACK-MOUNT SLIDES MODEL 305

SLIDE LENGTH 20 INCH

1. Remove the Upper Case. (Refer to Section 4-1)
2. Remove the two fixing screws on the Level Control Panel as shown in the figure.

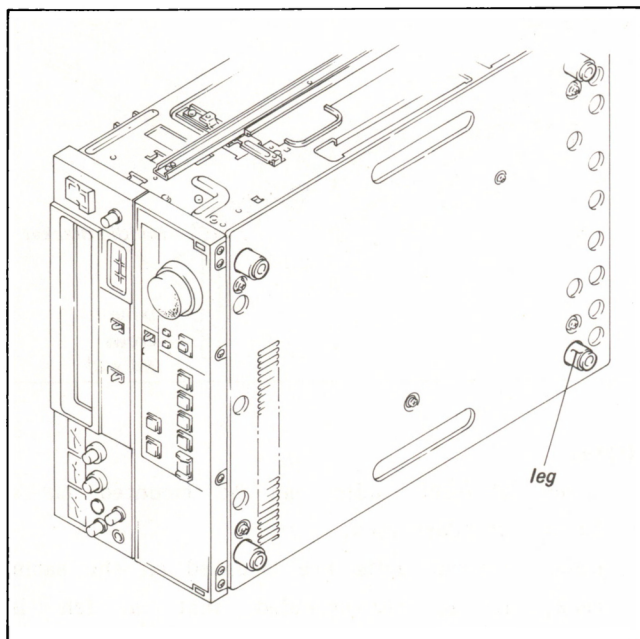


3. Remove the fixing screws (three each) on chassis (R) and chassis (L) as shown in the figure.

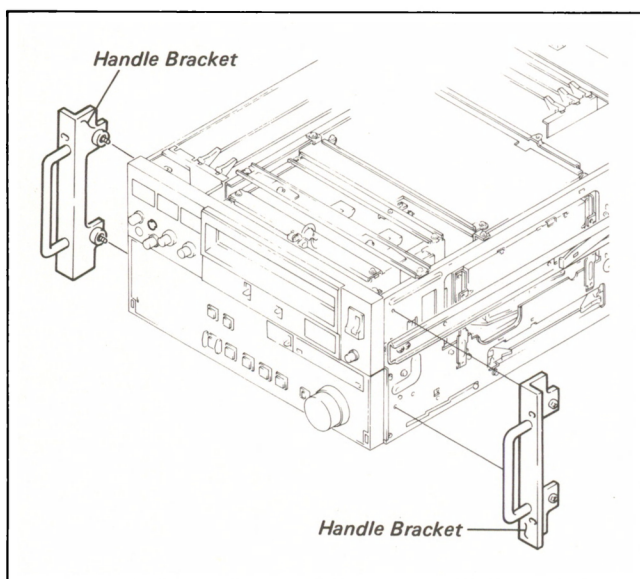


4. Attach the Inner Members of the Slide Rails to chassis (R) and chassis (L) with the screws removed in step 3.
 - . The installation screws must not be too long. If the screws supplied with the chassis are lost, screws 5 mm in length (B4 x 5) must be used.
 - . The Inner Member must be fastened at three points with the screws.

5. Remove the four legs located under the unit.
 . If the unit is mounted in the console without removing the legs, they will hit the console and the unit cannot be pulled out.



6. Attach the Outer Member Bracket of the Slide Rail to the console. Position the edge of the Slide Rail the specified distance from the outside of the console.
7. Attach the Handle Brackets.



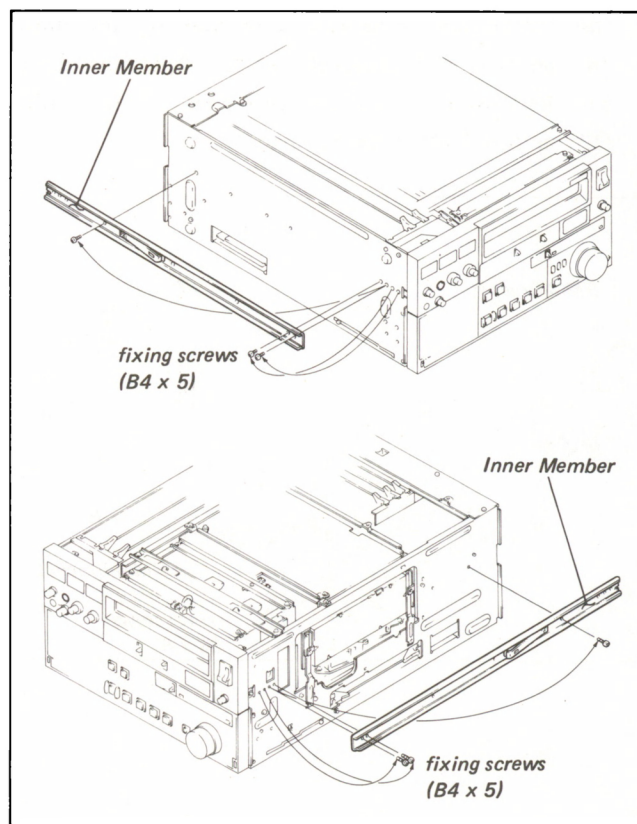
- (2) Rack-mounting of the BVU-900 on a 19-inch standard rack.

It is recommended that a RMM-950 Rack Mount Kit be used. This is an optional accessory which includes the Slide Rails, Handle Brackets and RMM-Brackets. If an RMM-950 is not available, use the following ACCURIDE slide rail:

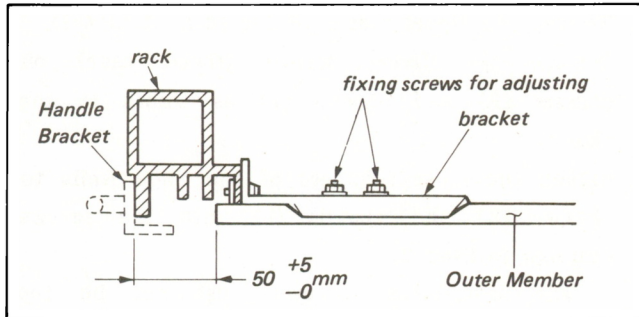
RACK-MOUNT SLIDES MODEL 305

SLIDES LENGTH 22 INCH

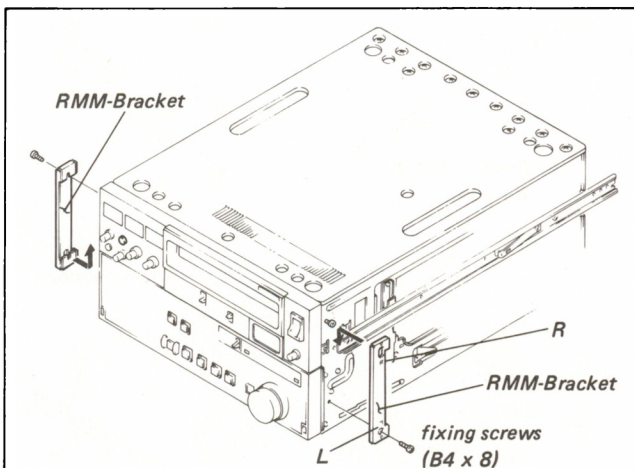
1. Remove the Upper Case. (Refer to Section 4-1)
2. Remove the fixing screws (three each) on chassis (R) and chassis (L) as shown in the figure.
3. Attach the Inner Members of the Slide Rails to chassis (R) and chassis (L) with the screws removed in Step 2.
 . The installation screws must not be too long. If the screws supplied with the chassis are lost, screws 5 mm in length (B4 x 5) must be used.
 . The Inner Member must be fastened at three points with the screws.



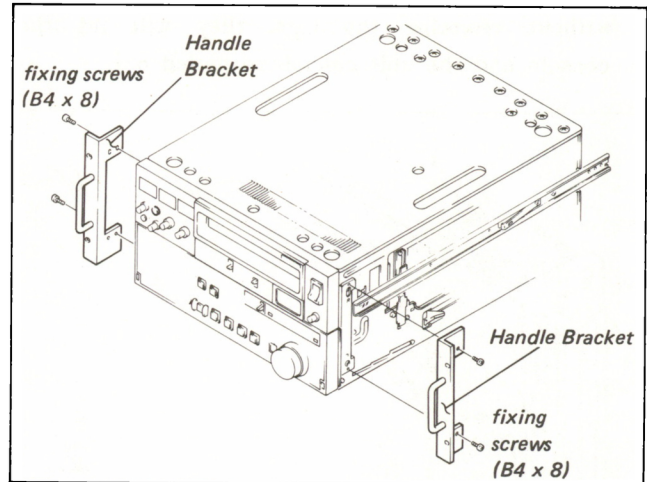
4. Remove the four the legs located under the unit.
. If the unit is mounted in the rack without removing the legs, they will contact the lower unit, and the unit cannot be pulled out.
5. Remove the Bottom Plate and then attach it to the top of the unit with two fixing screws.
6. Attach the Outer Member Bracket of the Slide Rail to the rack. Position the edge of the Slide Rail specified distance from the outside of the rack.



7. Thread the two fixing screws on the unit snugly, but do not tighten them. Install the RMM-Bracket as shown in the figure and then tighten the fixing screws. (When installing the RMM-Bracket on the right side of the unit, "R" on the RMM-Bracket is up. When installing the RMM-Bracket on the left side of the unit, "L" on the RMM-Bracket is up.)



8. Attach the Handle Brackets.



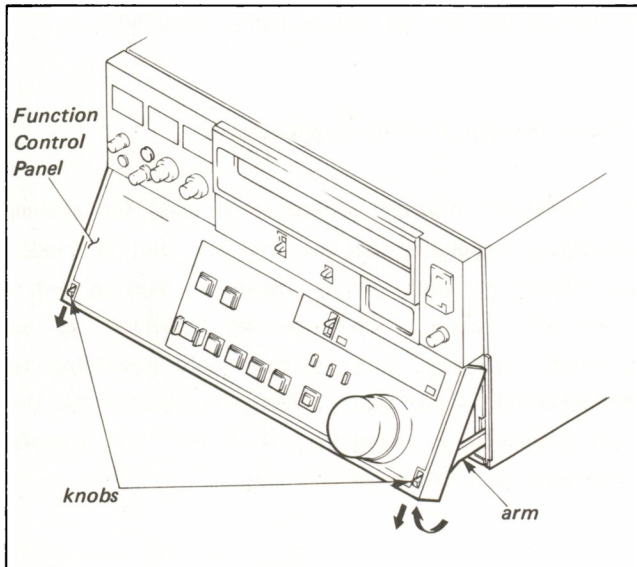
NOTE:

1. Seven BVU-900 units can be mounted on a 19-inch standard rack.
When several units are mounted on the same rack, it is recommended that a fan is installed for ventilation. Good air circulation is essential to prevent internal heat build-up in the rack. The 5 C to 40 C environmental condition must be met for all units.
2. Be sure to secure the rack to the floor to avoid accidents when a BVU-900 is pulled out.

1-9. FUNCTION CONTROL PANEL POSITIONING

Raise the Function Control Panel while pushing down on the left and right knobs on the front of the panel.

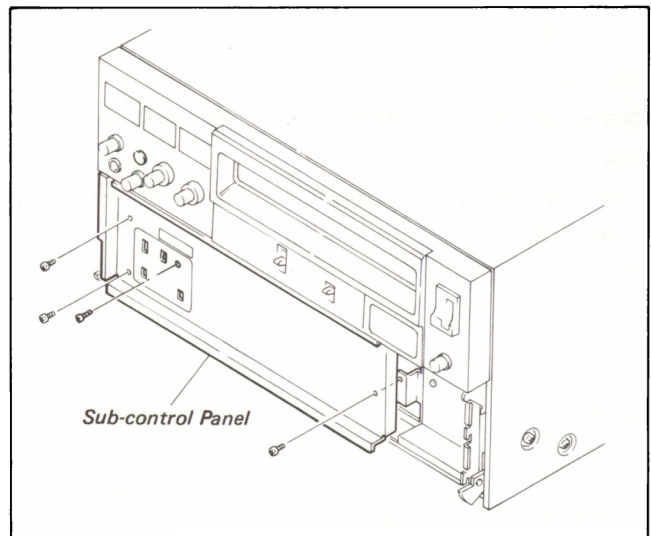
To replace the Function Control Panel, push the Function Control Panel down to its original position while lifting the left and right arms.



1-10. USE OF THE FUNCTION CONTROL PANEL AS A REMOTE CONTROL UNIT

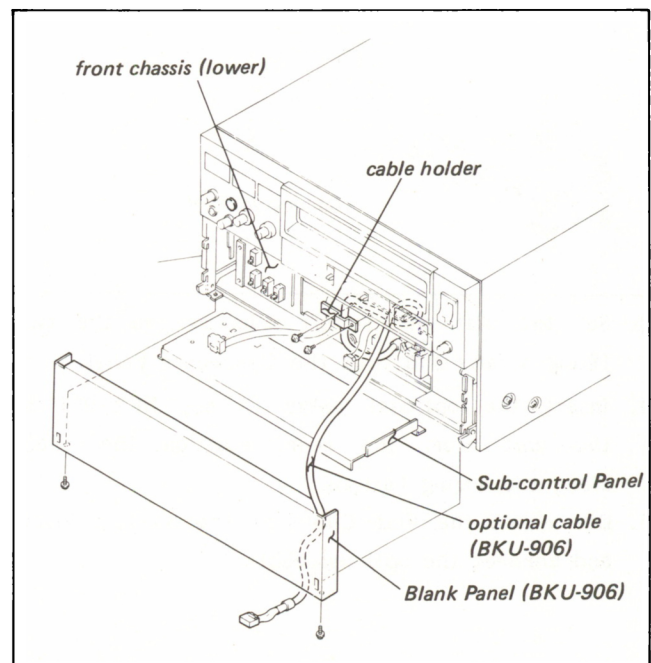
When the Function Control Panel Unit is removed from the unit to be used for remote control, perform the following steps.

1. Remove the Function Control Panel. (Refer to Section 4-2)
2. Remove the three fixing screws and remove Sub-control Panel.



case 1.

Extraction of the cable from the front of the unit

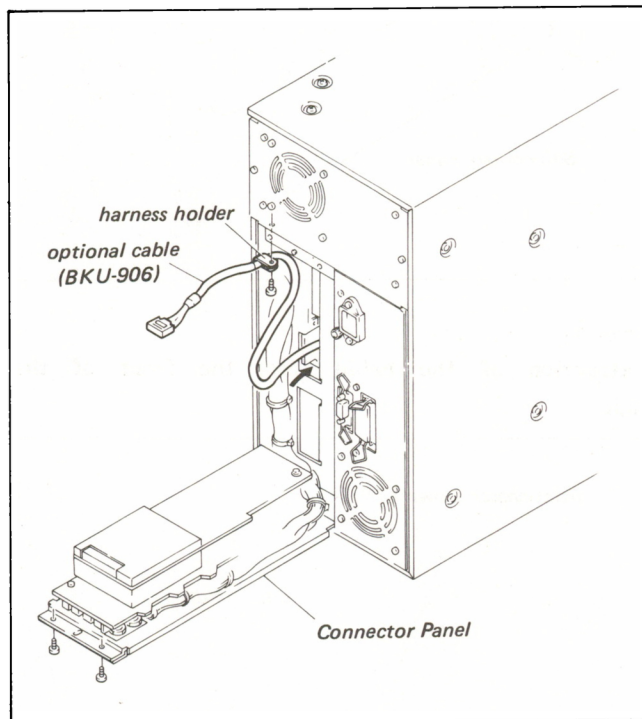


3. Disconnect the Flat Cable on the SY-102B Board, and then connect the optional Cable (5 m), BKU-906.
4. Loosen the fixing screw of the cable holder, slide the cable under the cable holder, and tighten the fixing screw.
5. Extract the cable from the notch in the top of the Front Chassis (lower) and attach Sub-control Panel with the three fixing screws.
6. Replace the Function Control Panel with the optional Blank Panel BKU-906. Pass the cable through the notch in the Blank Panel and attach it to the unit.

case 2.

Extraction of the cable from the rear of the unit

.These steps are continued from steps 1 and 2 of page 1-27.



3. Set the unit on its left side, remove the two fixing screws and open the Connector Panel.
4. Insert the optional cable (5 m), BKU-906 in the unit from the rear. Position the cable along the wiring harness.
5. Disconnect the Flat Cable on the SY-102 Board and connect the optional cable.

6. Set the unit on its bottom and loosen the fixing screw of the Harness Holder as shown in the figure. Insert the cable in the harness holder and tighten the fixing screw.
7. Pass the cable through the corner at the lower left-end of the Connector Panel and attach the Connector Panel.
8. Attach the Sub-control Panel with the three fixing screws.
9. Attach the optional Blank Panel, BKU-906.

1-11. REMOTE 2 (24P) CONNECTOR

The REMOTE 2 (24P) connector is used for system expansion, depending on the way the unit is used. The signal at each pin is listed in Section 1-3. Since the remote cable is not provided as an optional accessory, prepare the cable according to the REMOTE 2 pin listing. The part number for the cable connector is listed in Section 1-4. The remote cable can be a maximum of 10 m.

1-12. SUPPLIED ACCESSORIES

Supplied BVU-900 accessories are as follows:

1. AC Power Cord
2. 9-Pin Remote Control Cable (RCC-5G)
This cable is used for remote control from the BVU-950 as a recorder to the BVU-900 when the two units are used for tape to tape editing and dubbing.
3. Extension Boards (EX-127, EX-128)
The BVU-900 main circuit boards are the plug-in type which are easy to remove and install. Extension Boards are used for alignment and maintenance of the plug-in boards.
Two kinds of the Extension Boards are provided. Suitable Extension Board is used for alignment and maintenance of the main board. (Refer to Section 4-6)

1-13. OPTIONAL ACCESSORIES

The following optional accessories are available.
The appropriate accessories should be used for each system.

1. Plug-in Time Base Corrector (BKU-901A)

The TBC Board (TBC-5 Board) easily plugs into the BVU-900.

The BKU-901A can be controlled by the BVR-50 Remote Control Unit (supplied) through the TBC Remote Connector. This provides a stable playback picture.

2. Digital Noise Reducer (BKU-902)

The BKU-902 provides the noise reduction circuit reducers video signal noise and contributes to high-quality pictures. Still pictures selected by the field as well as the frame can be seen with the Freeze Function. When installing the BKU-902 in the VTR, attach the board to the TBC board of the BKU-901A. The operations are controlled on the BVR-55 remote control unit.

3. Control Panel Extension Kit (BKU-906)

The BKU-906 Blank Panel is a bracket which covers the exposed section of the BVU-900 when the Control Panel is removed.

The BKU-906 contains a Cord Retainer and 10-pin Remote Control Cable (5 m) to connect between the VTR and the Control Panel.

4. Top Cover Panel (BKU-909)

The BKU-909 is used to protect the BVU-900 mounted on the Sony System Console or on the 19-inch standard rack from dust.

5. Control Panel Case (BK-803)

The BK-803 is a Control Panel Case to house the Remote Control Panel when it is removed from the BVU-900.

6. Rack Mount Kit for the Sony System Console (RMM-501)

The RMM-501 is used for mounting the BVU-900 on the Sony System Console.

It consists of two Slide Rails and two Handle Brackets.

7. Rack Mount Kit for a 19-inch standard rack (RMM-950)

The RMM-950 is used for mounting the BVU-900 on a 19-inch standard rack.

It consists of two Slide Rails, two RMM-Brackets and two Handle Brackets.

8. 9-pin Remote Control Cable

Three kinds of 9-Pin Remote Control Cables are provided.

Type	Length
RCC-5G:	5 m
RCC-10G:	10 m
RCC-30G:	30 m

These Remote Cables are used for connecting to the BVU-950 through the 9-Pin Remote Connector. The remote cable can be a maximum of 1200 m.

SECTION 2

TECHNICAL INFORMATION

2-1. SPECIFICATIONS

MECHANICAL

Weight : 27.5 Kg
Dimensions : 424 x 237 x 552 mm (w/h/d)
Operating position : Horizontal (less than 30°)
Tape transport mechanism : U-matic system
Video cassette : U-matic KSP, KSP-S, KCA, KCS video cassettes or equivalent
Tape speed : 9.53 cm/s
playback time : 60 min. max. with KSP-60 video cassette
Wow/flutter : Less than 0.15% rms
Fast forward time: : Less than 3 min. with KSP-60 video cassette
Rewind time : Less than 2.5 min. with KSP-60 video cassette
Search speed : SHUTTLE:
Still, 1/30, 1/10, 1/5, 1/2, 1, 2, 5, and 10 times normal in forward and reverse direction
JOG:
Still to 1 time normal in forward and reverse direction
Operating temperature : +5°C to +40°C
Storage temperature : -20°C to +60°C

CONNECTORS:

AC IN : 3-pin AC connector
VIDEO OUT : BNC connectors (2)
AUDIO OUT CH-1/L, CH-2/R : XLR male connectors
AUDIO OUT MONITOR : XLR male connector
TIME CODE OUT : BNC connector
DUB OUT : 7-pin female connector
SC IN : BNC connector
REF VIDEO IN (EXT SYNC IN) : BNC connectors (2)
REF VIDEO OUT : BNC connector
RF (OFF TAPE) : BNC connector
TBC REMOTE : 15-pin connector
MONITOR : 8-pin connector and BNC connector
REMOTE 1 : RS-422 9-pin connector
REMOTE 2 : 24-pin connector
HEADPHONES : JM-60 stereo phone jack

ELECTRICAL

Power requirements : AC 100 - 120 V
50 / 60 Hz
Operating voltage : AC 90 - 264 V
Power consumption : 125 W

VIDEO

Video system	: Luminance: FM Chroma: SC low-range conversion
Output	: NTSC composite video, sync negative, 1.0 ± 0.2 Vp-p, 75 Ohms, unbalanced
Dubbing output	: Luminance signal: 1.7 ± 0.2 Vp-p, sync negative, impedance 50 Ohms $\pm 10\%$ Chroma signal: 0.9 ± 0.1 Vp-p, impedance 50 Ohms $\pm 10\%$
Horizontal resolution	: SP mode: 340 lines (monochrome/color mode) Conventional mode: 260 lines (monochrome/color mode)
Signal to noise ratio	: SP mode: Color mode: More than 47 dB Luminance(Y): More than 49 dB Conventional mode: Color mode: More than 47 dB
K-factor (2T pulse)	: Less than 3% (SP mode)
DG	: Less than 3% (SP mode)
DP	: Less than 3° (SP mode)
Y/C delay	: Less than 25 ns (SP mode)

AUDIO

Output	: (LINE) +4 dBm, balanced (600 Ohm load permissible) (MONITOR) +4 dBm, 600 Ohm load, balanced (HEADPHONES) -46 dB to -26 dB, 8 Ohm load, stereo
Distortion	: Less than 2.0% (1 kHz reference level)
Frequency response	: SP mode: 50 Hz to 15 kHz ± 3 dB Conventional mode: 50 Hz to 15 kHz ± 4 dB
Signal to noise ratio	: SP mode: More than 52 dB (at 3% distortion level, without audio NR system) Conventional mode: 50 dB (at 3% distortion level)

TIME CODE

Output	: 0 ± 3 dB, low impedance, unbalanced (0 dB = 1.55 Vp-p pulse)
--------	--

SC

Input	: $2 + 1, -1.5$ Vp-p, 75 Ohms, unbalanced
-------	--

REF VIDEO

Input	: 1.0 ± 0.2 Vp-p, 75 Ohms, unbalanced
(EXT SYNC IN	: 0.2 Vp-p to 5 Vp-p, negative, 75 Ohms, unbalanced)
Output	: Without the TBC Board: No output With the TBC Board and an input signal at REF VIDEO IN: Same level as REF VIDEO IN (1.0 ± 0.2 Vp-p), 75 Ohms, unbalanced With the TBC Board, but without an input signal at REF VIDEO IN: B.S. (0.28 Vp-p/0.28 Vp-p), 75 Ohms, unbalanced

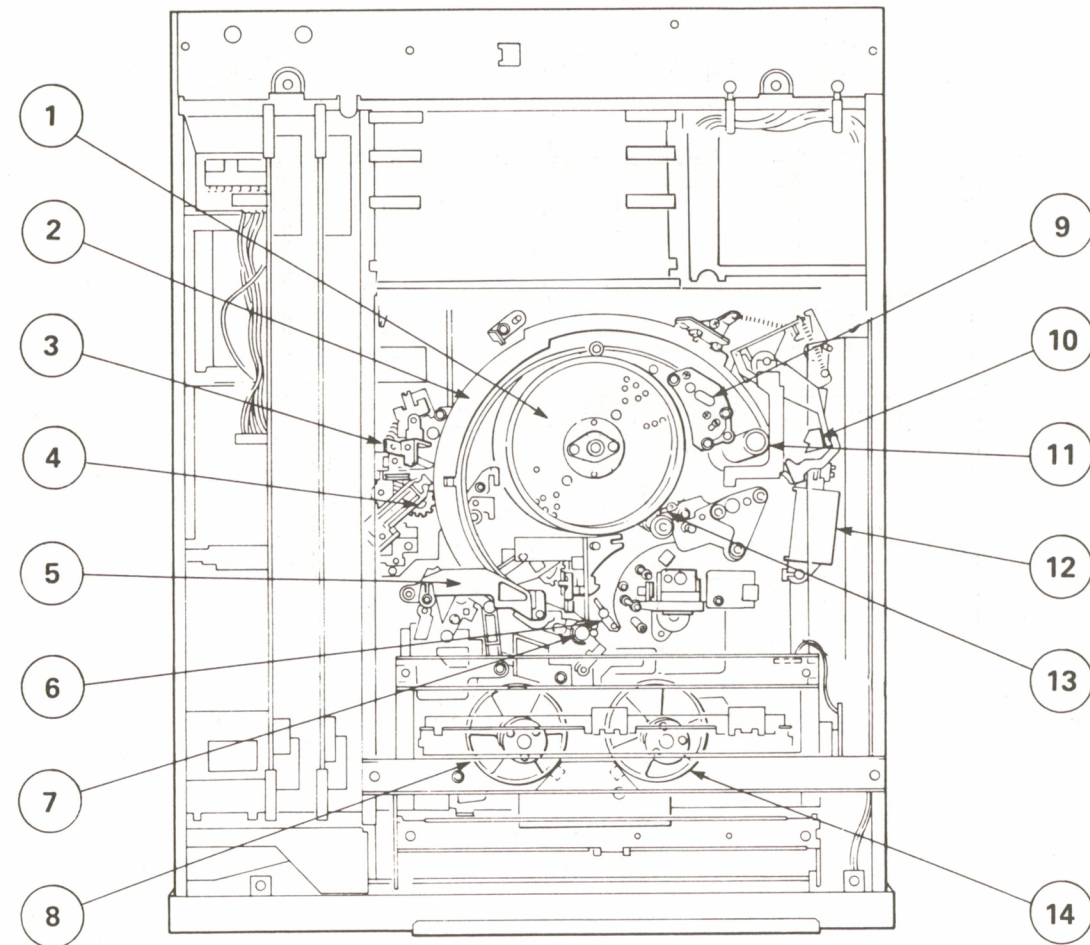
RF (OFF TAPE)

Output	: 0.5 Vp-p, 75 Ohms, unbalanced
--------	---------------------------------

2-2. LOCATION OF MAIN PARTS

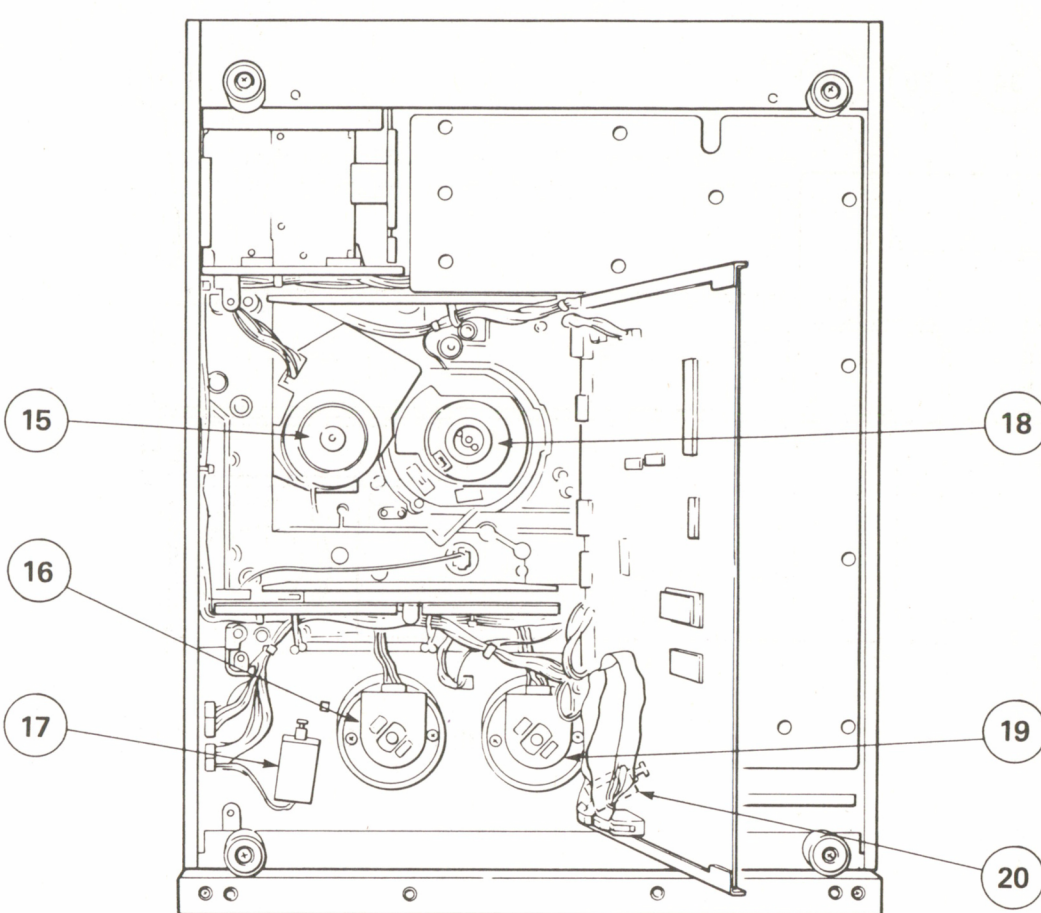
2-2-1. Location of the Mechanical Main Parts/Components

<TOP VIEW>



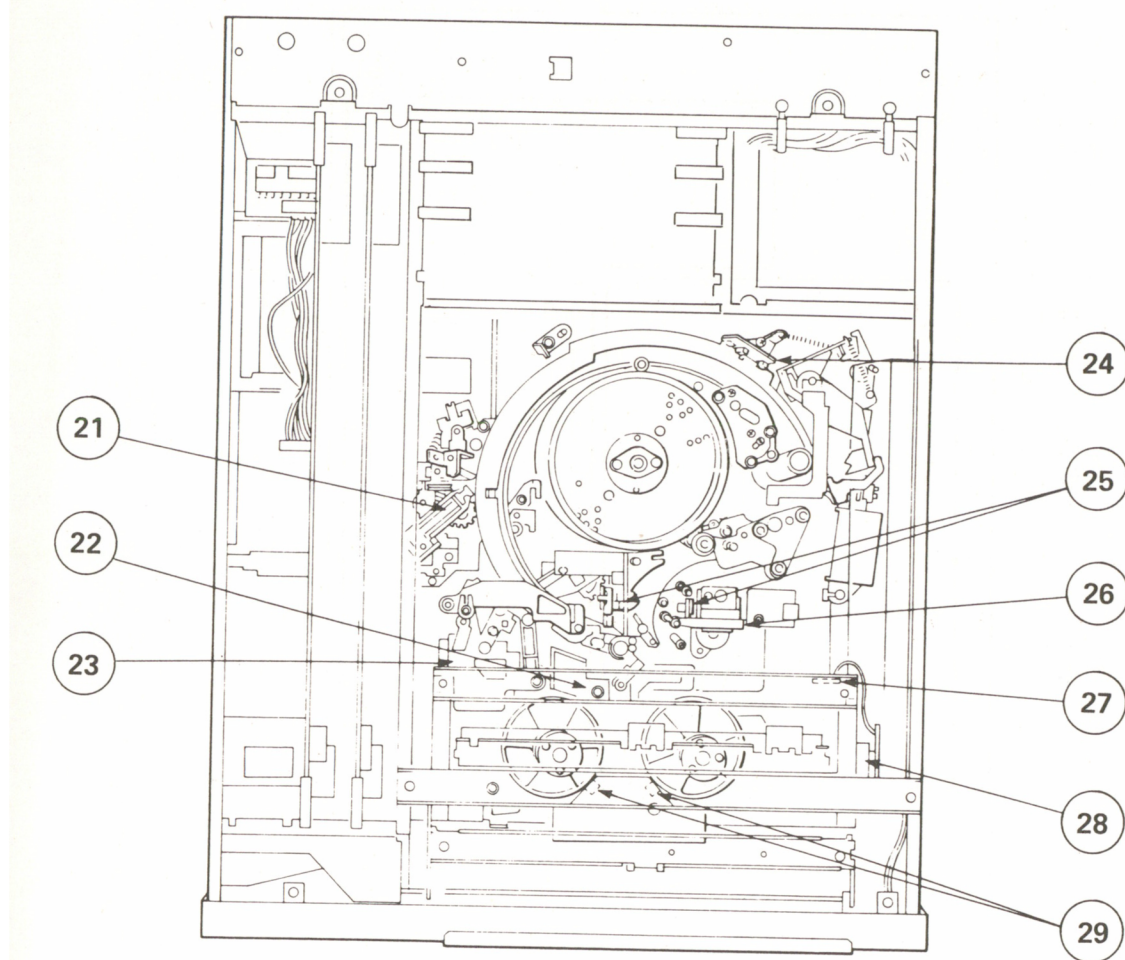
- | | |
|----------------------|---------------------|
| ① Drum | ⑨ Audio/CTL Head |
| ② Threading Ring | ⑩ Pinch Lever |
| ③ T Correction Guide | ⑪ Capstan Shaft |
| ④ Gear Box | ⑫ Pinch Solenoid |
| ⑤ T Drawer Arm | ⑬ Time Code Head |
| ⑥ S Drawer Arm | ⑭ Supply Reel Table |
| ⑦ Pinch Roller | |
| ⑧ Take-up Reel Table | |

<BOTTOM VIEW>



- | |
|-------------------------------|
| ⑮ Capstan Motor |
| ⑯ S Reel Motor |
| ⑰ Supply Reel Brake Solenoid |
| ⑱ Drum |
| ⑲ T Reel Motor |
| ⑳ Take-up Reel Brake Solenoid |

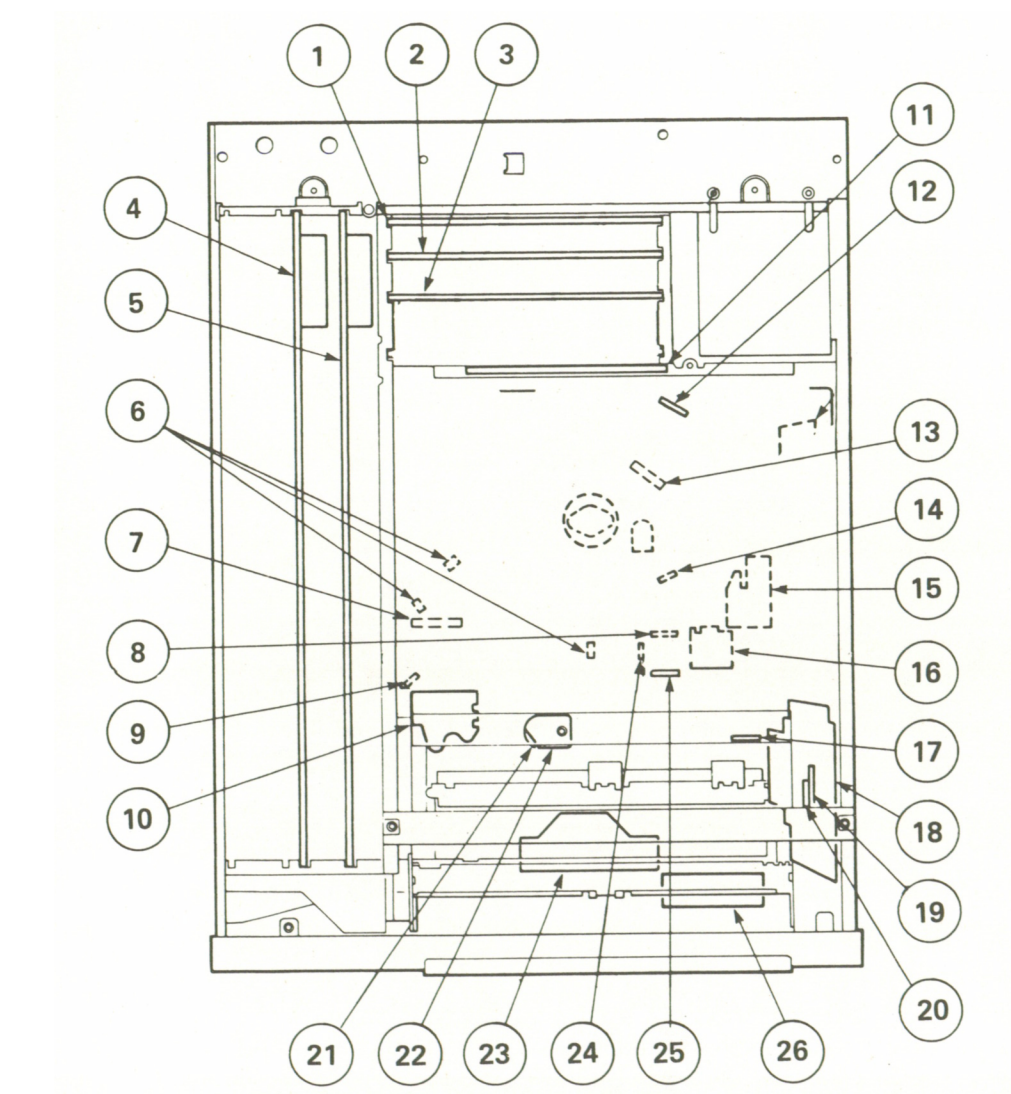
<SENSOR BLOCK>



- | |
|---------------------------------|
| ⑳ Tape Beginning sensor |
| ㉑ Take-up Side Tension Detector |
| ㉒ TRC Detector |
| ㉓ FR Detector |
| ㉔ Tape End Sensor |
| ㉕ Supply Side Tension Detector |
| ㉖ Cassette-in Detector |
| ㉗ Cassette-down Detector |
| ㉘ Reel Rotation Detector |

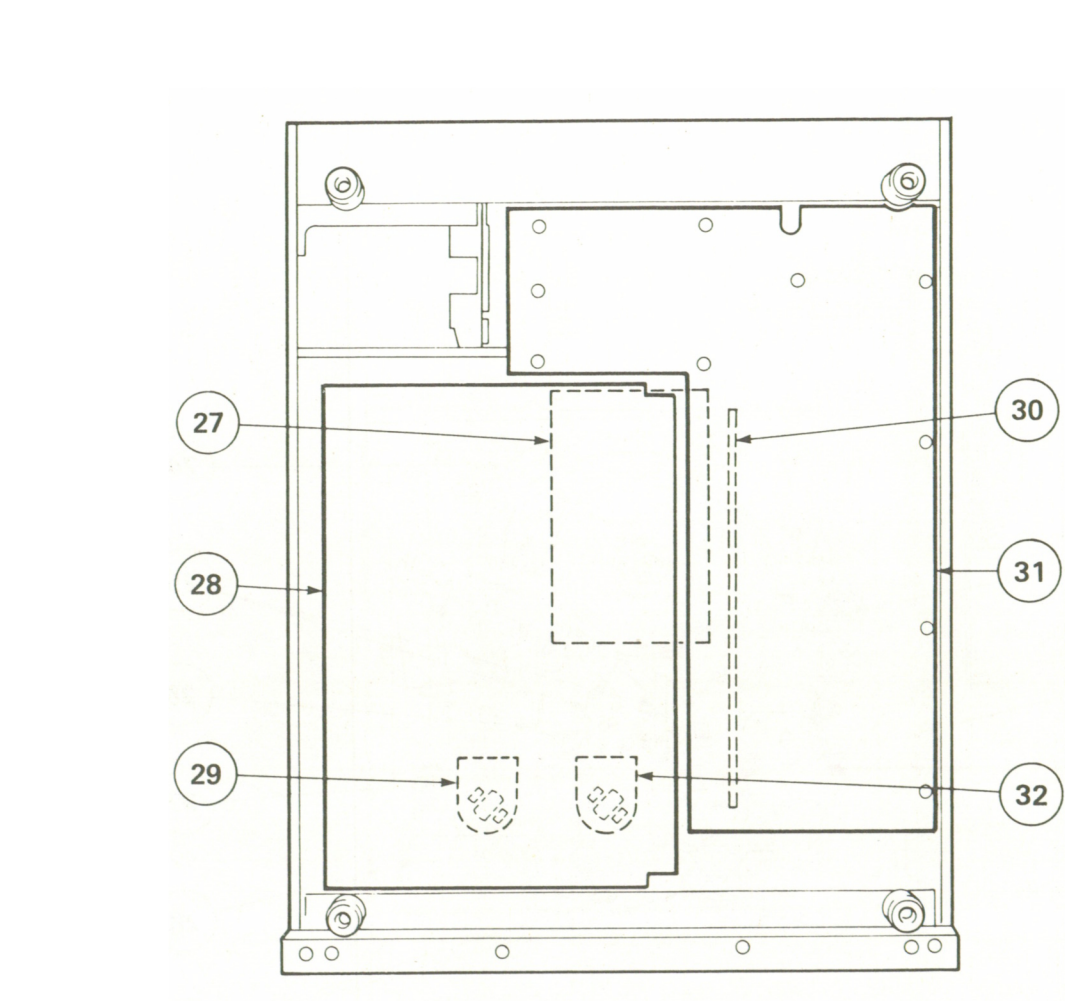
2-2-2. Location of the Printed Circuit Boards

<TOP VIEW>



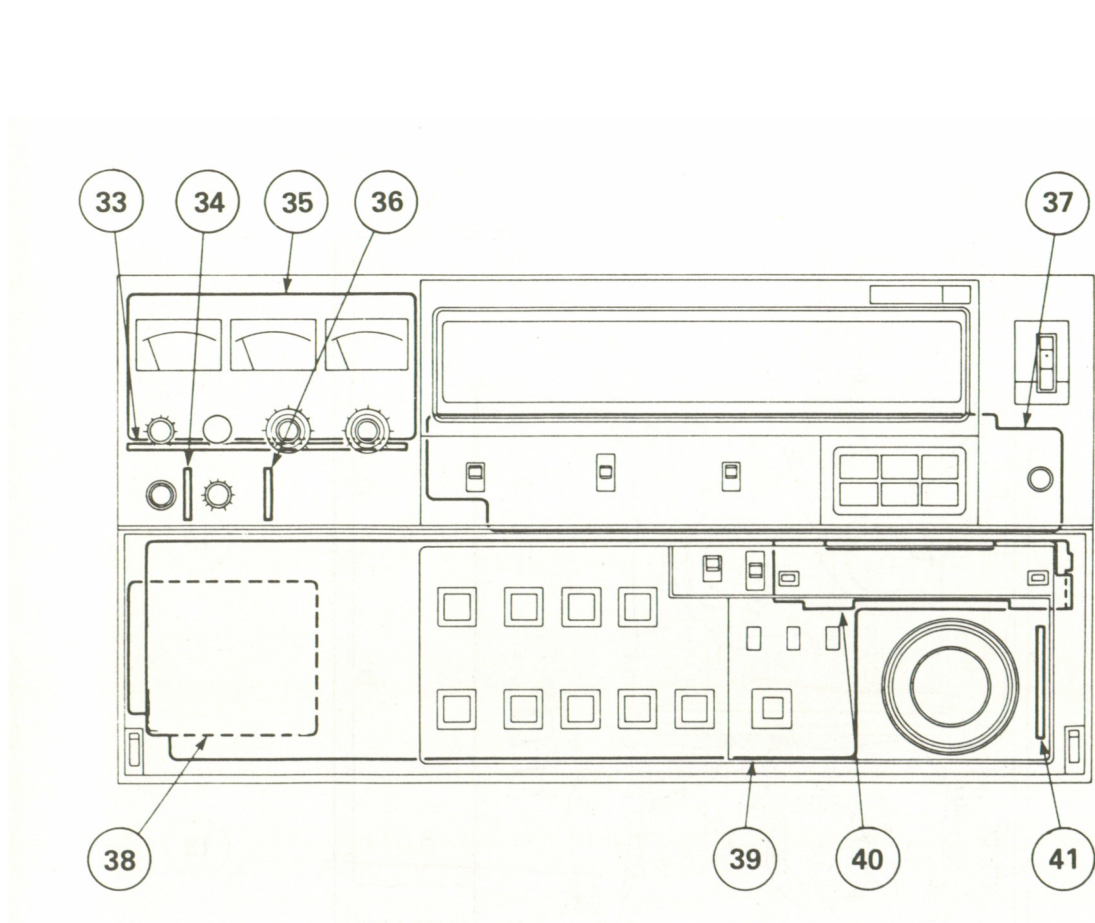
- | | | |
|----------------|--|--|
| ① AU-85C Board | ⑪ HN-80A Board | ⑳ CC-33 Board
(Cassette-up compartment) |
| ② BC-11A Board | ⑫ PTC-33 Board | |
| ③ AP-23 Board | ⑬ DUS-92 Board | ㉑ LE-54 Board |
| ④ DM-54A Board | ⑭ HN-84 Board | ㉒ PTC-29 Board |
| ⑤ SV-88C Board | ⑮ DUS-147 Board | ㉓ SE-48 Board |
| ⑥ PH-5 Board | ⑯ HN-83 Board | ㉔ PTC-26 Board |
| ⑦ LM-13 Board | ⑰ CC-32 Board
(Cassette-up compartment) | ㉕ PTC-28 Board |
| ⑧ LE-53 Board | ⑱ PD-45 Board | ㉖ LP-41 Board
(Cassette-up compartment) |
| ⑨ PTC-34 Board | ㉙ CC-31 Board
(Cassette-up compartment) | |
| ⑩ PTC-30 Board | | |

<BOTTOM VIEW>



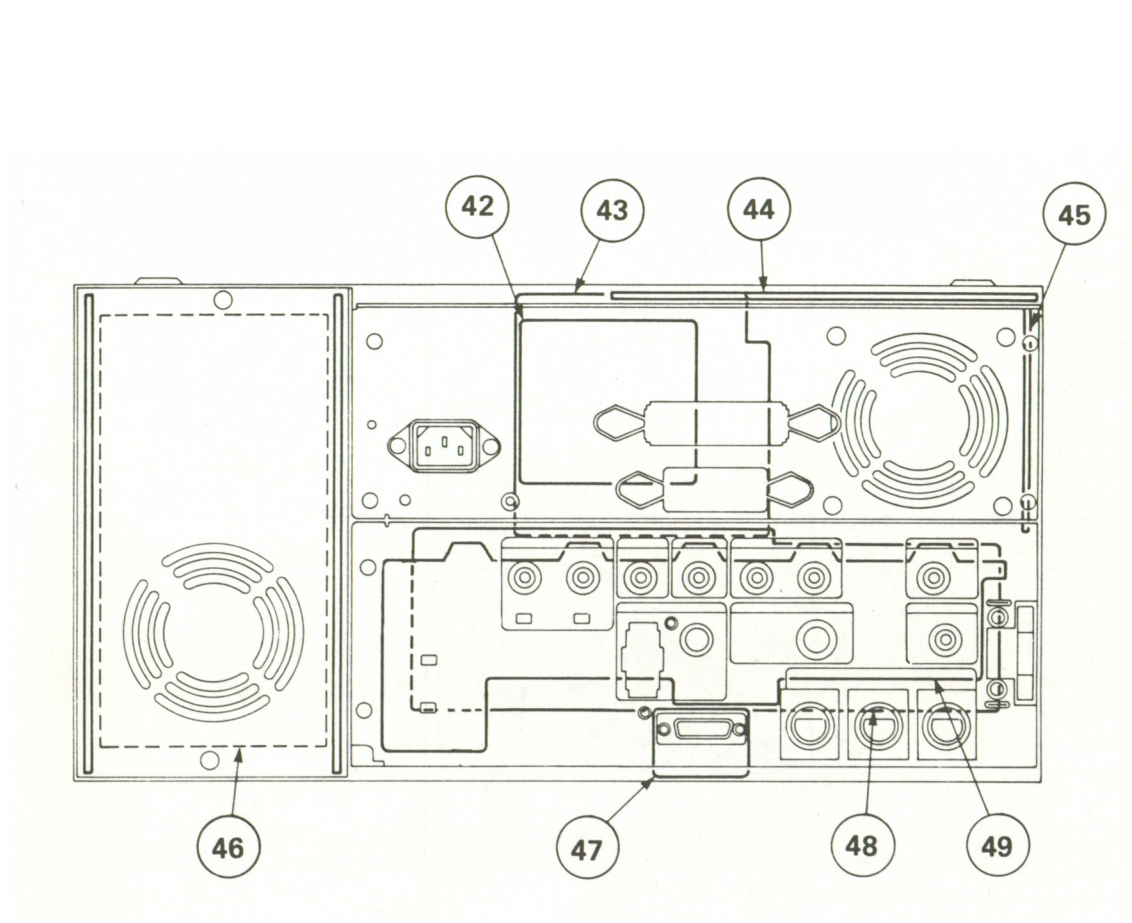
- | |
|-----------------|
| ㉗ TC-51 Board |
| ㉘ SY-102B Board |
| ㉙ DUS-178 Board |
| ㉚ MB-139 Board |
| ㉛ MB-127A Board |
| ㉜ DUS-177 Board |

<FRONT VIEW>



- | |
|-----------------|
| ㉝ VR-76 Board |
| ㉞ HP-28 Board |
| ㉟ MT-28 Board |
| ㊱ VR-49 Board |
| ㊲ SW-170B Board |
| ㊳ SW-290 Board |
| ㊴ KY-144A Board |
| ㊵ DP-62 Board |
| ㊶ PTC-32 Board |

<REAR VIEW>



- | |
|------------------------------|
| ㊷ RM-44 Board |
| ㊸ AC-78 Board |
| ㊹ DR-53 Board |
| ㊺ DR-59 Board |
| ㊻ Switching Regulaor (UR-21) |
| ㊼ RM-45 Board |
| ㊽ AU-87A Board |
| ㊾ CP-109A Board |

2-3. PRINTED CIRCUIT BOARDS

Circuit information is provided below.

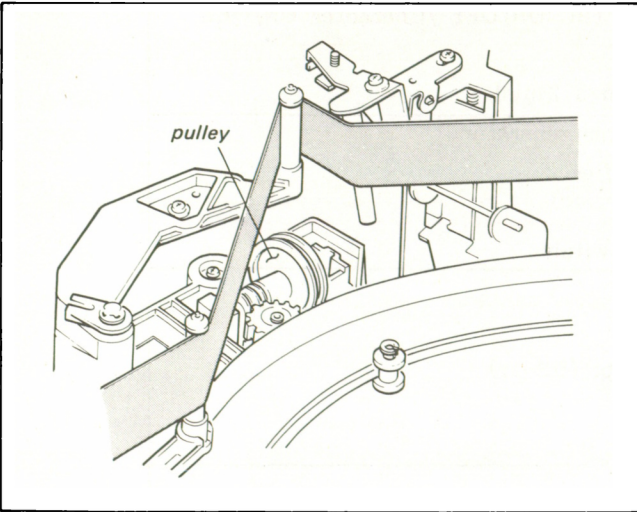
SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIDEO	DM-54A	Y/C demodulator
	MT-28	Video level meter
	PD-45	RF PB amplifier
AUDIO	AP-23	Audio PB/DOLBY prosessor
	AU-85C	DOLBY auto detector
	AU-87A	Output/monitor amplifier
	VR-76	PB level control
	MT-28	Audio level meter
	VR-49	Headphones level control
	HP-28	Headphones
	DUS-92	Audio head
	DUS-147	Junction board for audio head
	SW-170B	Audio monitor select
SERVO	SV-88C	Drum/capstan/reel servo
	SE-48	Reel rotation detector
	DR-53	Motor driver for reel/capstan/drum
	DR-59	Motor driver for reel
	PTC-28	S-tension CdS
	LE-53	S-tension LED
	PTC-29	T-tension CdS
	LE-54	T-tension LED
	DUS-177	T-reel motor
	DUS-178	S-reel motor
	VR-76	Tracking control

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
SYSCON	SY-102B	System control
	KY-144A	Function key board
	DP-62	Display
	BC-11A	Video/audio timing control
	HN-80A	Threading motor driver
	LM-13	Threading motor
	PD-45	Cassette-up compartment motor driver /Solenoid driver
	CC-31	Cassette compartment driver
	CC-32	Cassette in detector
	CC-33	Cassette down detector
	PTC-30	SP, KCA detector
	PTC-33	FR stop detector
	PTC-34	Uuthread end detector
	PH-5(A)	Tape top LED
	PH-5(B)	Tape top sensor
	PH-5(C)	Tape end LED
	PTC-26	Tape end sensor
	SW-170B	Select switch /warning indicator
	SW-290	Remote 1/2 Select /TBC ON/OFF /Character ON/OFF
TIME CODE	PTC-32	Search dial
	RM-44	Remote control (9pin & 24pin)
	TC-51	Time code / character generator
	BC-11A	Time code PB amplifier
POWER	HN-84	Time code head
	SW-290	Time code control Switch
	AC-78	AC primary circuit
	M1	Switching Regulator (UR-21)
	M2	
	C1	
OTHERS	C2	
	MB-127A	Mother board
	MB-139	Sub mother for TC
	CP-109A	Connector panel
	RM-45	TBC remote control
	EX-127	Extension board for Audio/Time code
	EX-128	Extension board for Video/Servo/TBC
	HN-80A	Relay board for video/tape sensor/ threading motor driver
	HN-83	Relay board for time code head
	LP-41	Cassette compartment light
	TBC-5	Time base corrector (Option)
	DUS-151	

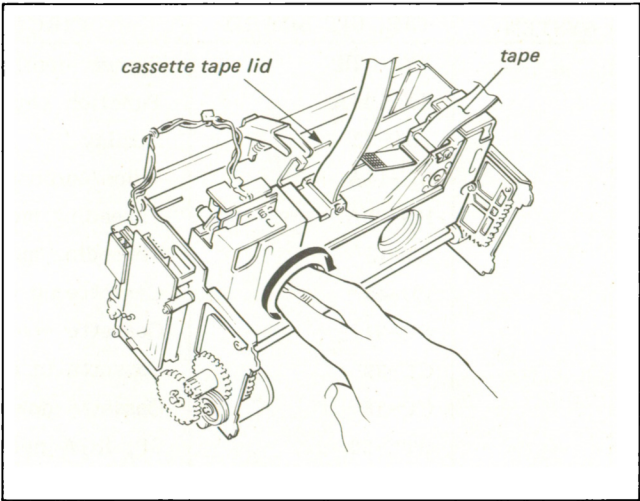
2-4. CASSETTE REMOVAL PROCEDURE WHEN
NORMAL EJECTION IS NOT POSSIBLE

If the EJECT operation becomes impossible due to trouble or the Cassette-up Compartment does not rise when the EJECT operation takes place, the cassette tape can be removed from the unit by following the procedures described below.

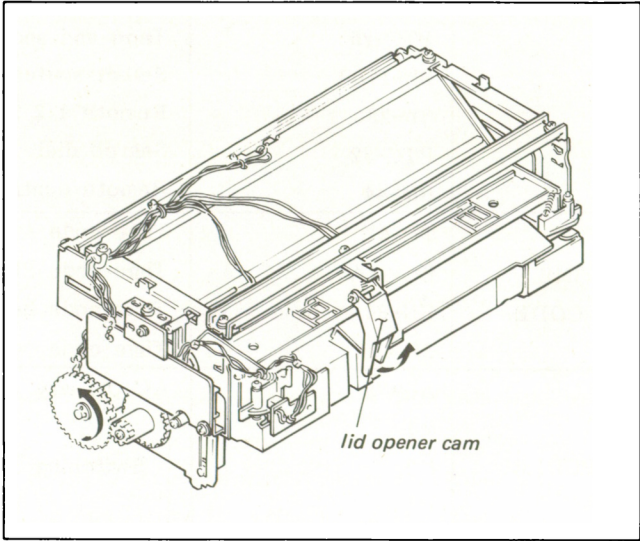
1. Turn the POWER OFF.
2. Remove the Upper Case. (Refer to Section 4-1)
3. Remove the SV-88C and DM-54A (and TBC-5) Boards.
4. Turn the white pulley of the Gear Box by hand in a clockwise direction until the Threading Ring is in the unthread end position. (The Threading Ring moves in the unthreading direction. However, the tape remains at the position of threading completion.)



5. Disconnect the connector CN1 on the CC-31 Board of the Cassette-up Compartment.
6. Remove the Cassette-up Compartment Stay. (Refer to Section 4-3)
7. Slowly lift the Cassette-up Compartment with the cassette tape in it. Remove the tape remaining in the unit carefully so that it is not damaged.
8. Hold the Cassette Tape Lid so that it does not close. Wind the tape into the cassette by turning the reel hub on the bottom of the cassette by hand.



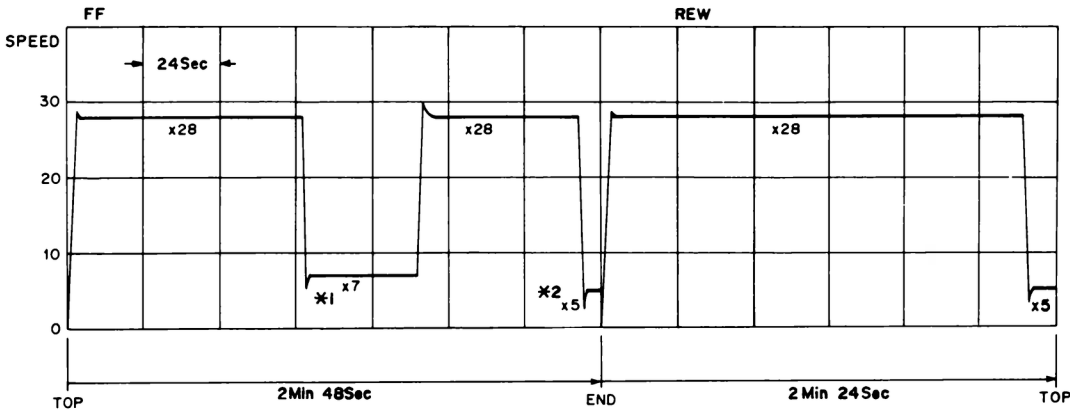
9. Raise the Cam for opening the lid and close the Cassette Tape Lid.



10. Remove the tape from the Cassette-up Compartment.
11. Turn the white gear on the right side of the Cassette-up Compartment by hand in a counterclockwise direction in order to place the Cassette-up Compartment into the up-state.
12. Locate the cause of the trouble and remedy the problem.

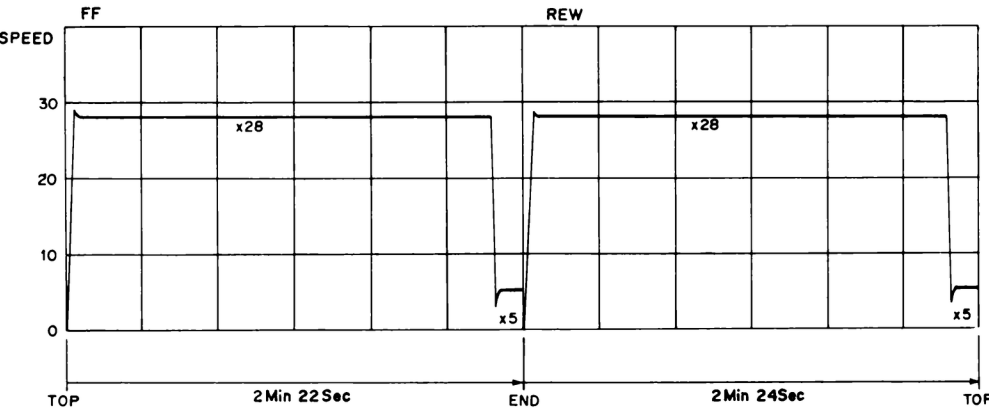
2-5. THE TAPE SPEED AND TIME IN FF AND REW MODE

1. KCA-60 (When the cassette tape is inserted at tape top, and the first time operation. Do not speed down at the tape middle after FF or REW operation is performed once.)

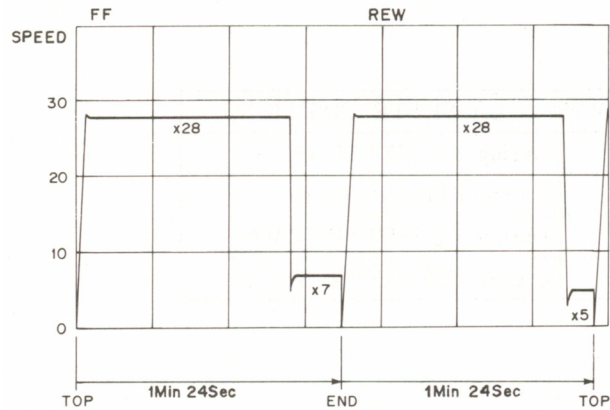


- *1 Detect the reel hub diameter.
- *2 The tape runs at five times normal speed when the tape is near end.

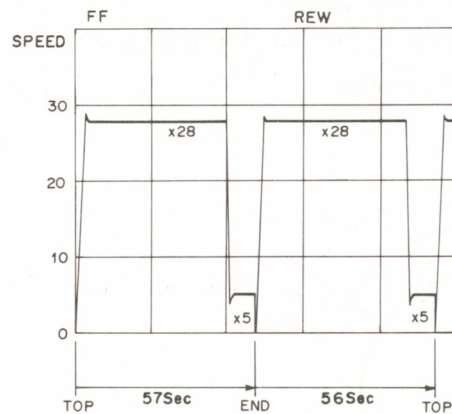
2. KCA-60 (When the supply reel hub diameter is smaller than large hub once:)



3. KCA-30 (Supply reel is large diameter hub.)

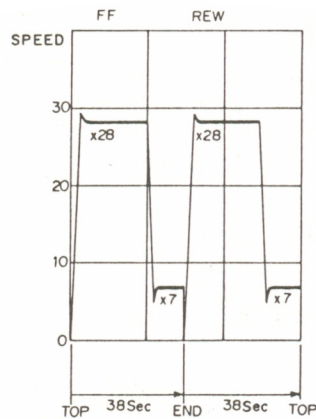


4. KCS-20



When the KCS-20 cassette tape is inserted at the middle of the tape, the tape runs at 7 times normal speed in FF and REW modes until T reel or S reel hub diameter is smaller than a large hub.

5. KCS-10 (Both Take-up reel and Supply reel are large bub.)



(NOTE)When the unit is in TBC ON mode, the tape runs at 22 times normal speed in FF mode. Therefore the fast foward time takes time.

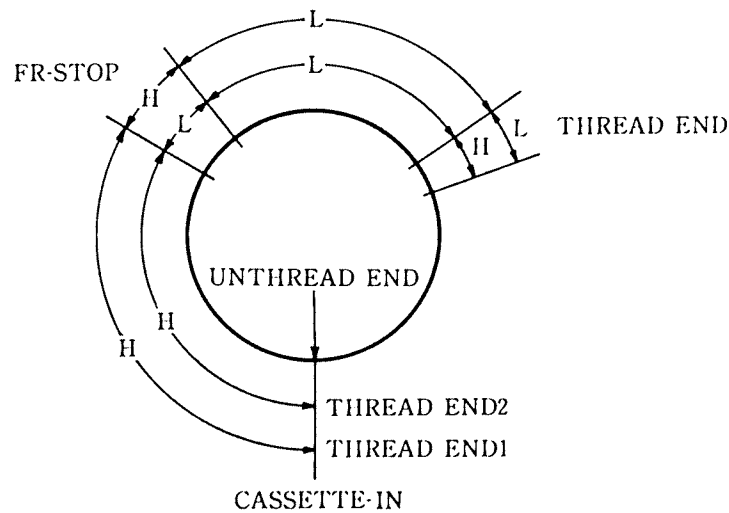
2-6. Mode Conversion Diagram and Timing Chart

※1 CASSETTE IN/CASSETTE DOWN

CASSETTE IN	CASSETTE DOWN	CASSETTE POSITION
L	L	During CASSETTE-IN
L	H	CASSETTE-UP State
H	L	During CASSETTE-DOWN
H	H	CASSETTE-DOWN State

※2 THREAD END1/THREAD END2

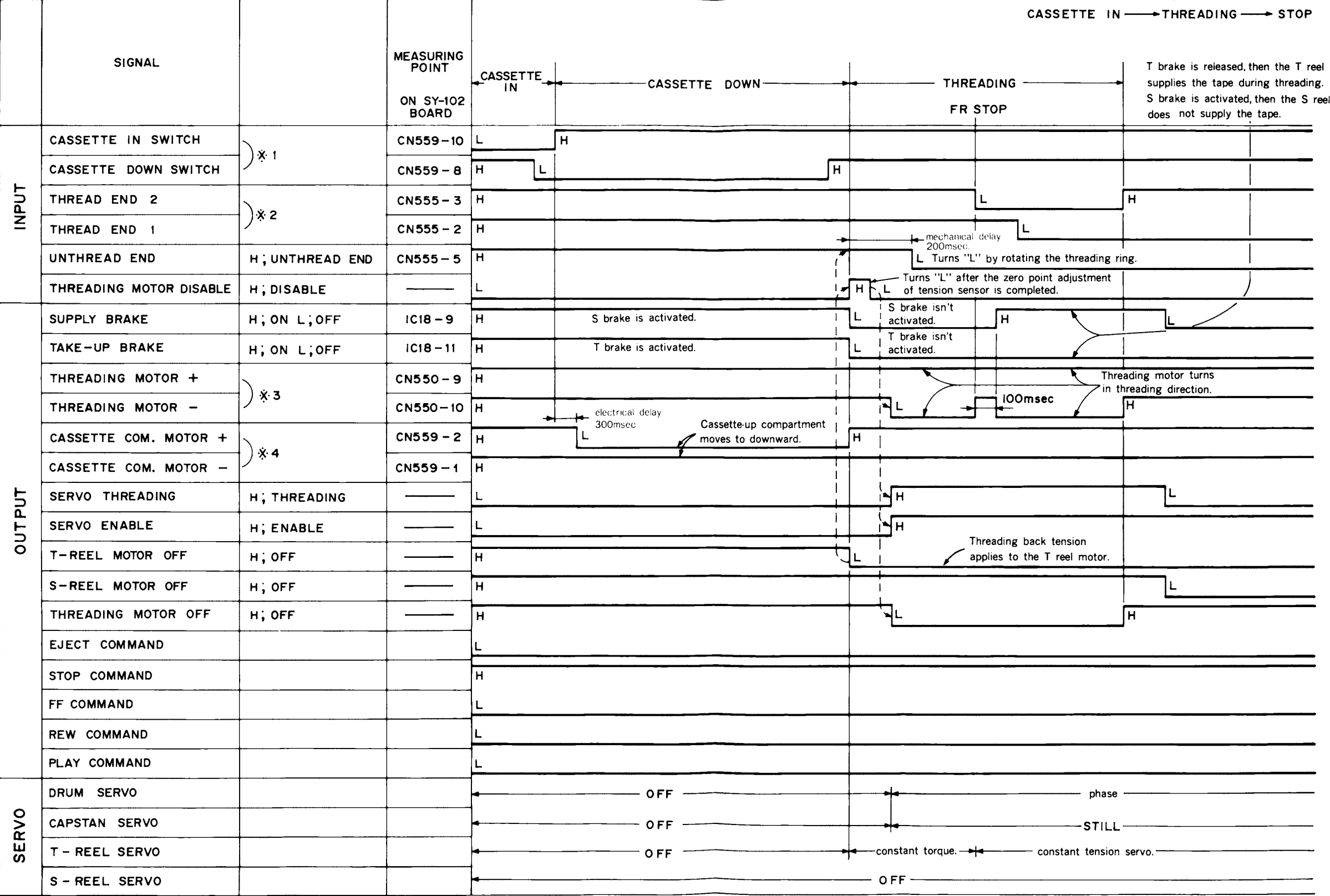
THREAD END1	THREAD END2	THREADING RING POSITION
H	H	Between CASSETTE-IN and FR-STOP
L	H	THREAD END position
L	L	Between FR-STOP and THREAD END
H	L	FR-STOP position



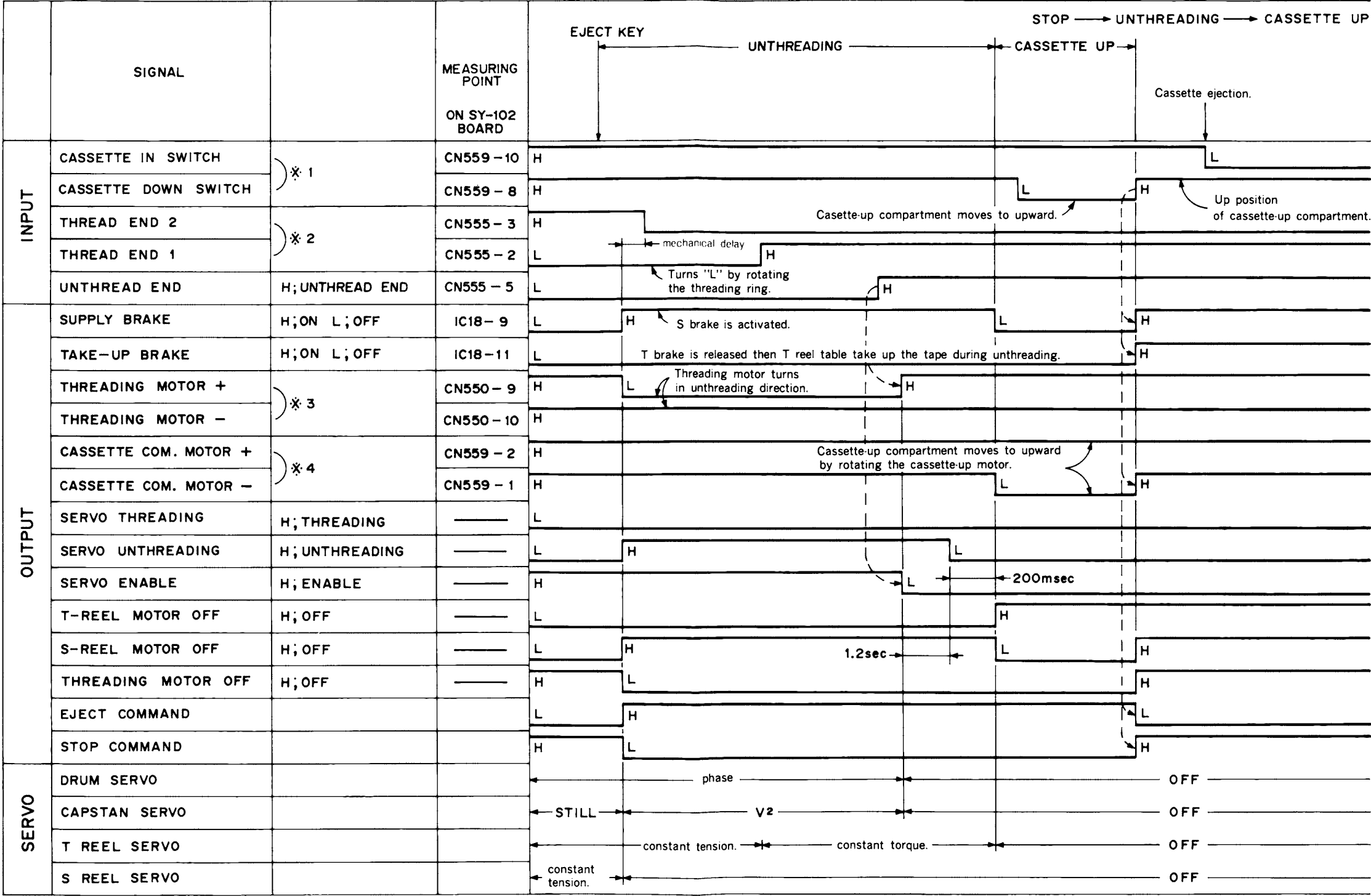
※3 THREADING MOTOR(+) : H } → THREADING OPERATION
 THREADING MOTOR(-) : L }
 THREADING MOTOR(+) : L } → UNTHREADING OPERATION
 THREADING MOTOR(-) : H }

※4 CASSETTE COM. MOTOR(+) : L } → CASSETTE DOWN OPERATION
 CASSETTE COM. MOTOR(-) : H }
 CASSETTE COM. MOTOR(+) : H } → CASSETTE UP OPERATION
 CASSETTE COM. MOTOR(-) : L }

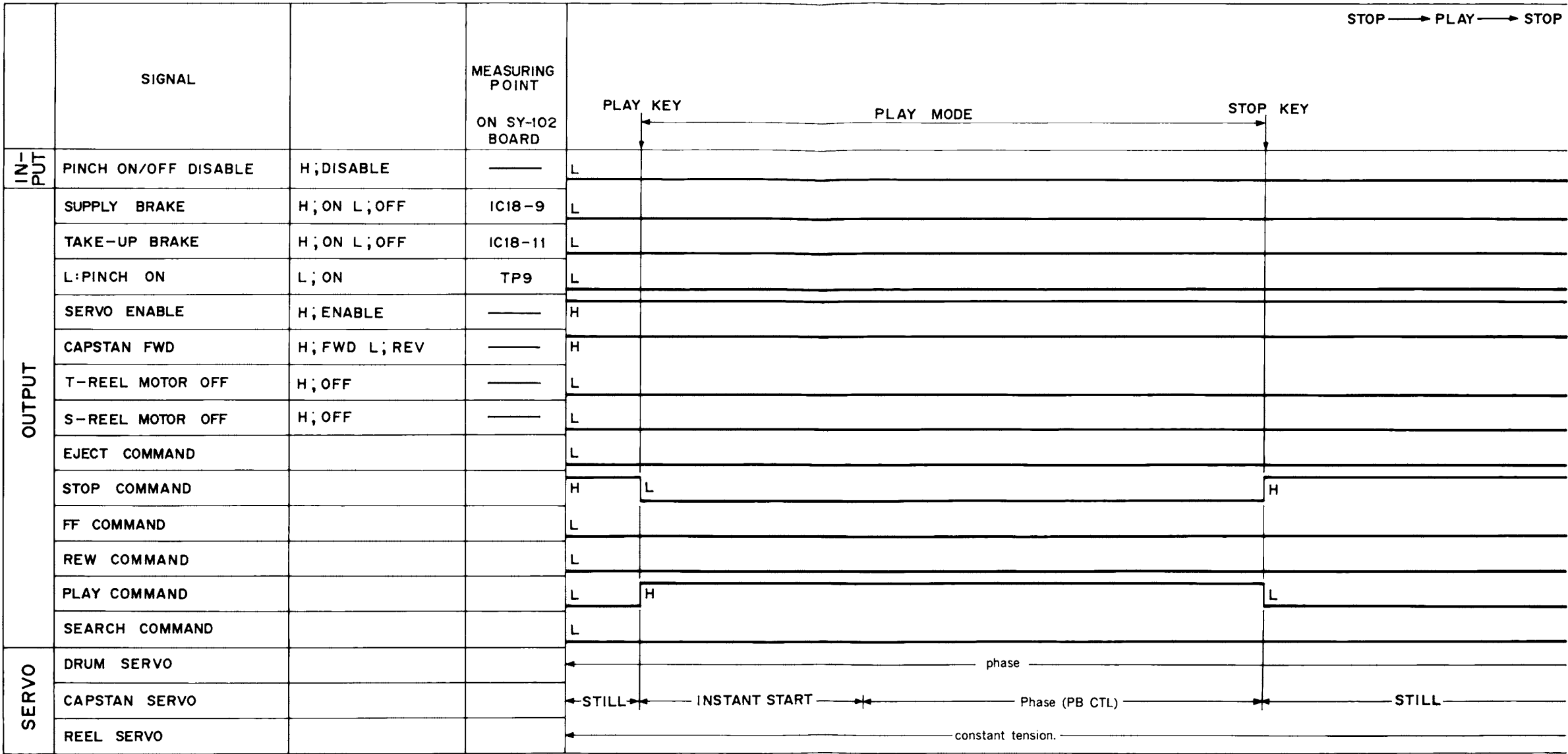
1. CASSETTE IN → THREADING → STOP



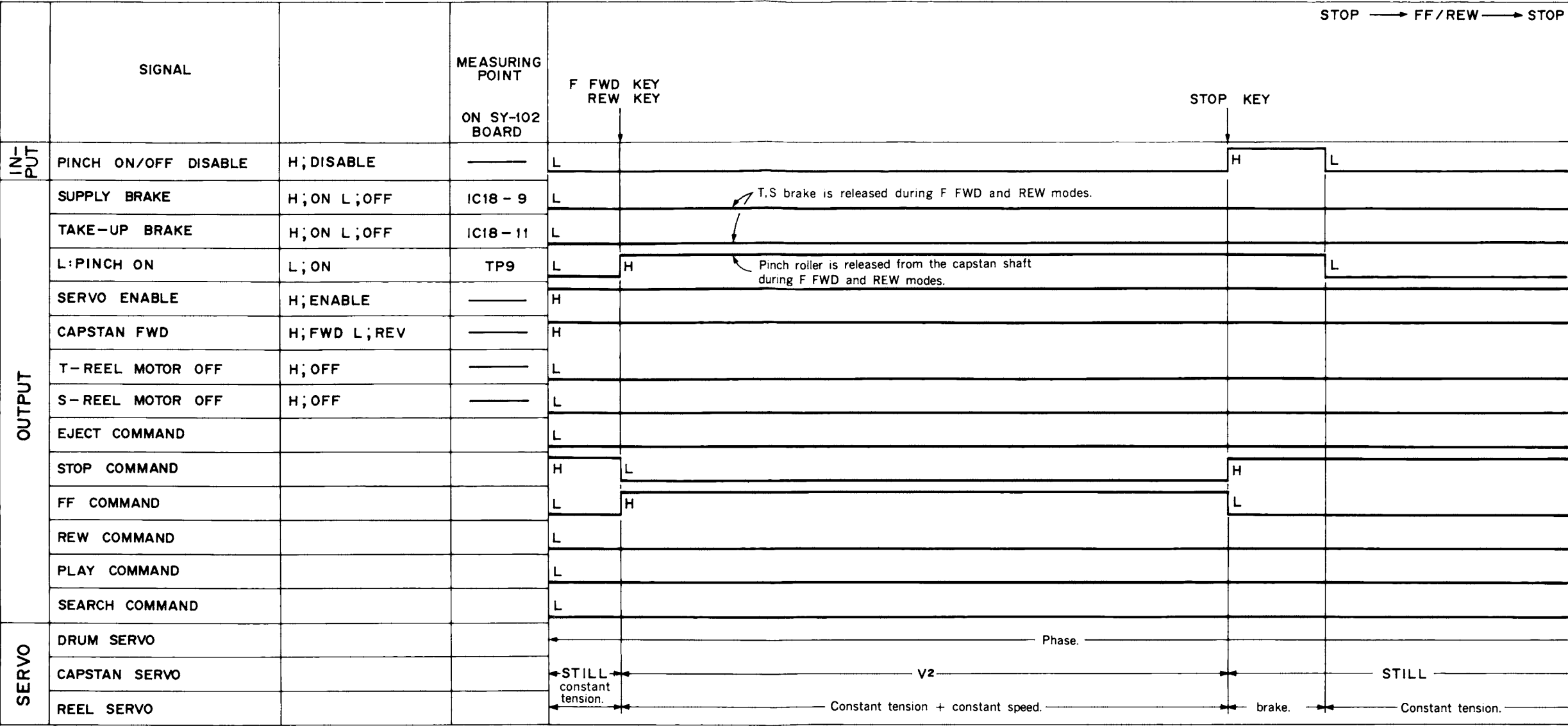
2. STOP → UNTHREADING → CASSETTE UP



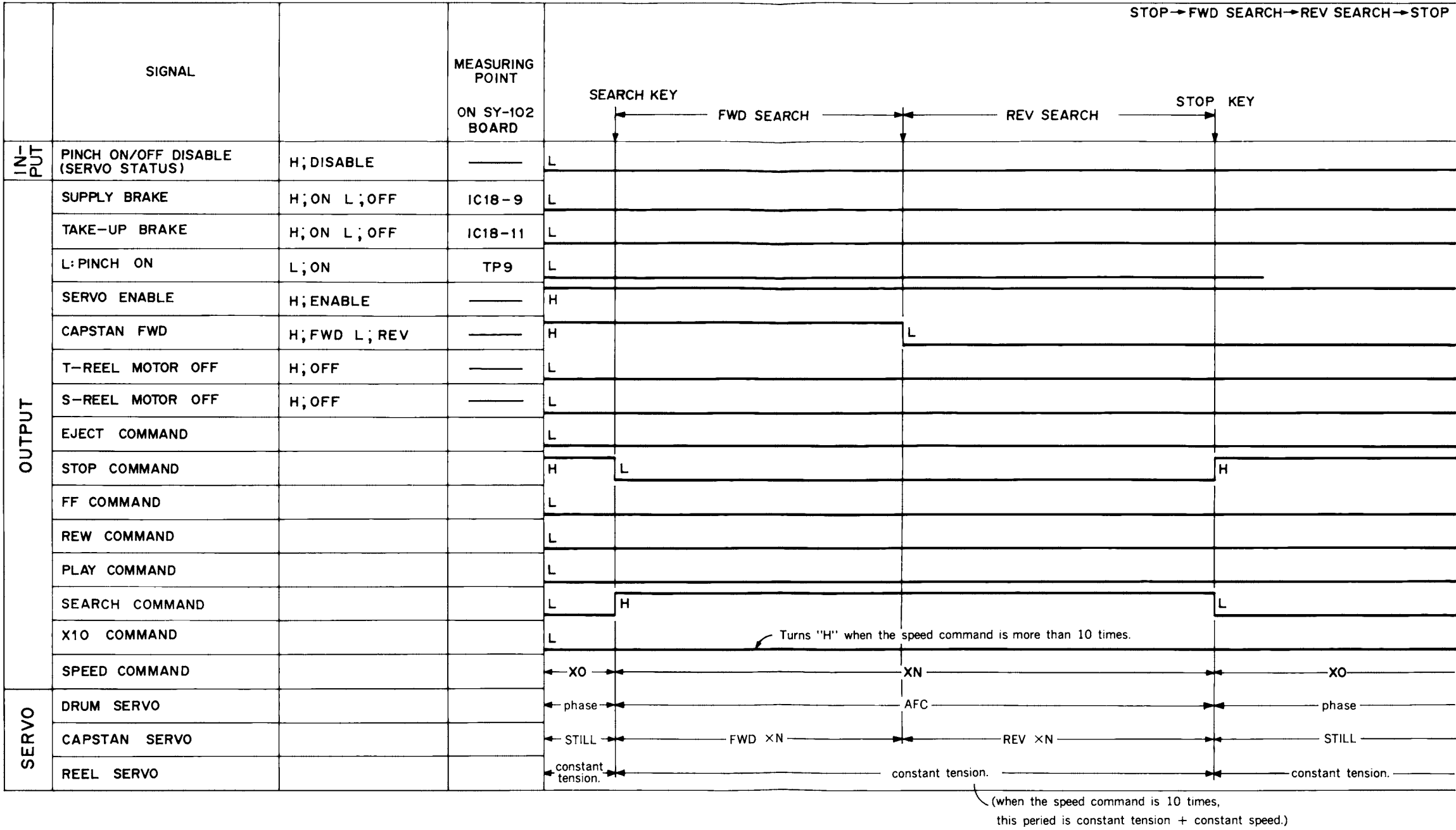
3. STOP → PLAY → STOP



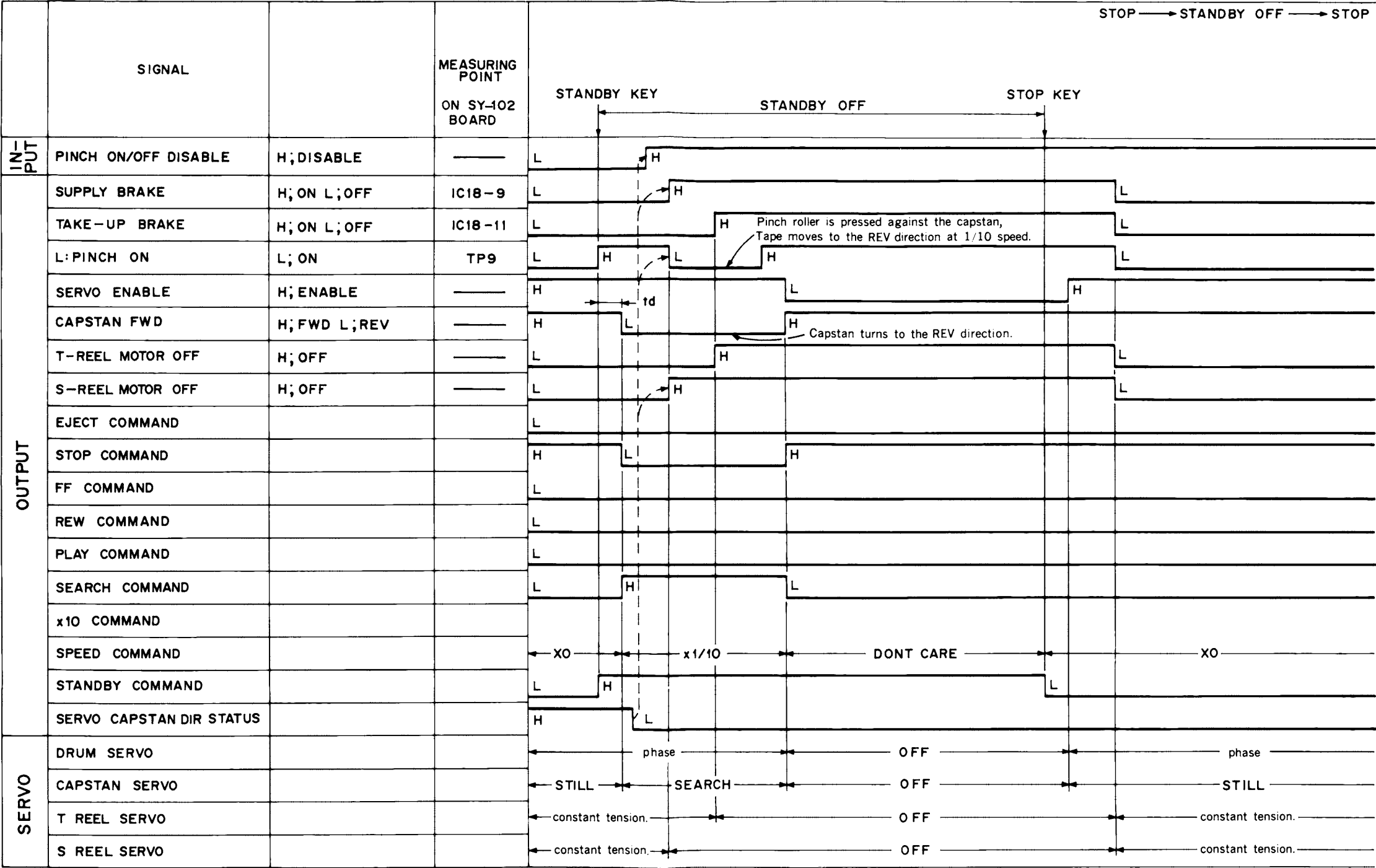
4. STOP → FF/REW → STOP



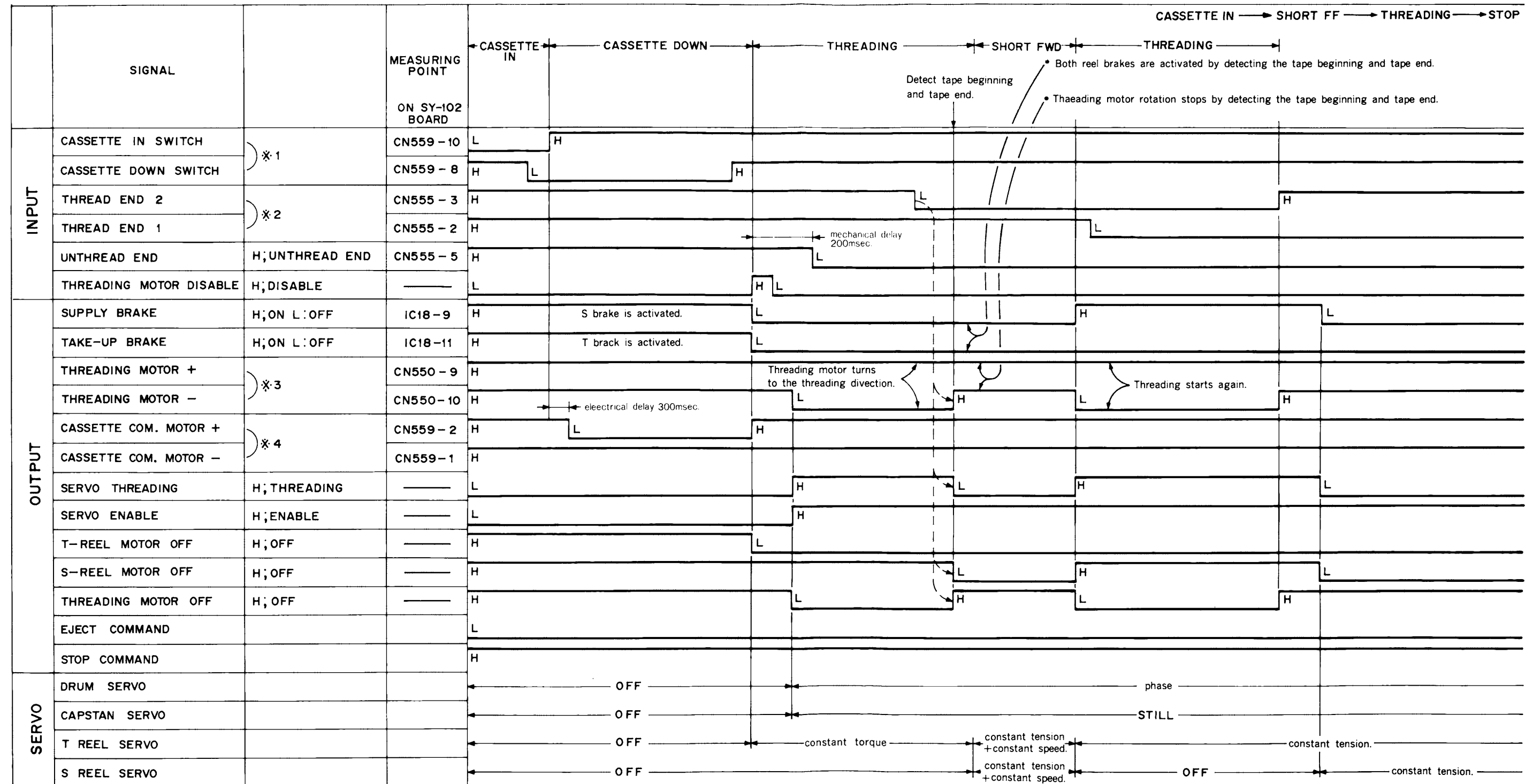
5. STOP → FWD SEARCH → REV SEARCH → STOP



6. STOP → STANDBY OFF → STOP



7. CASSETTE IN → SHORT FF → THREADING → STOP



SECTION 3

PERIODIC CHECK AND MAINTENANCE

3-1. SYSTEM CONTROL OPERATION CHECK

It is recommended that the following checks are made daily before operating the unit.

The check procedure described here is for the BVU-900, with or without the remote control unit.

Note that switches must be set the way the unit is used after the checks.

3-1-1. Play Back, F.FWD, REW, SHUTTLE, JOG and Preroll Function Check

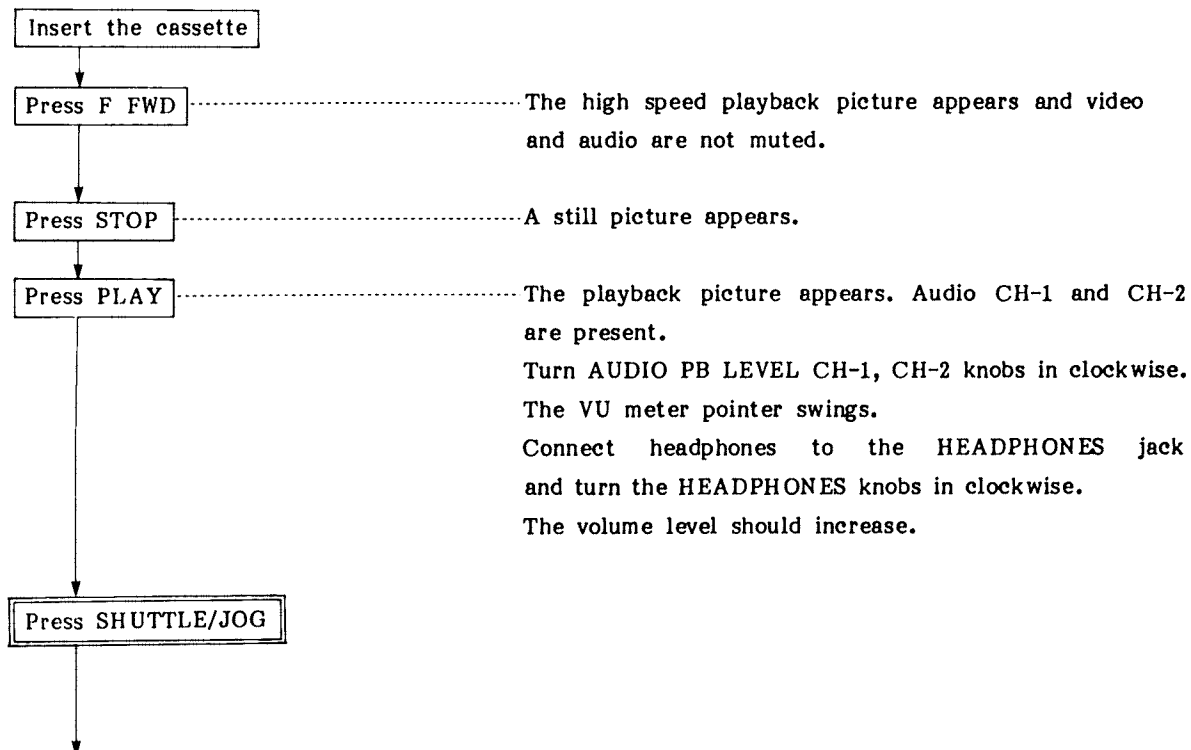
- . Insert a recorded tape (Video, Audio CH-1/CH-2, Time Code). (Do not use an alignment tape.)
- . Connect a video and audio monitor.
- . The following procedures are used when ITEM NO.209, SELECTION FOR SEARCH DIAL ENABLE in DIAL MENU Operation is set to VIA SEARCH BUTTON. When it is set to DIAL DIRECT, the procedure indicated within double lines is not necessary. (Refer to Section 1-6 for further details.)

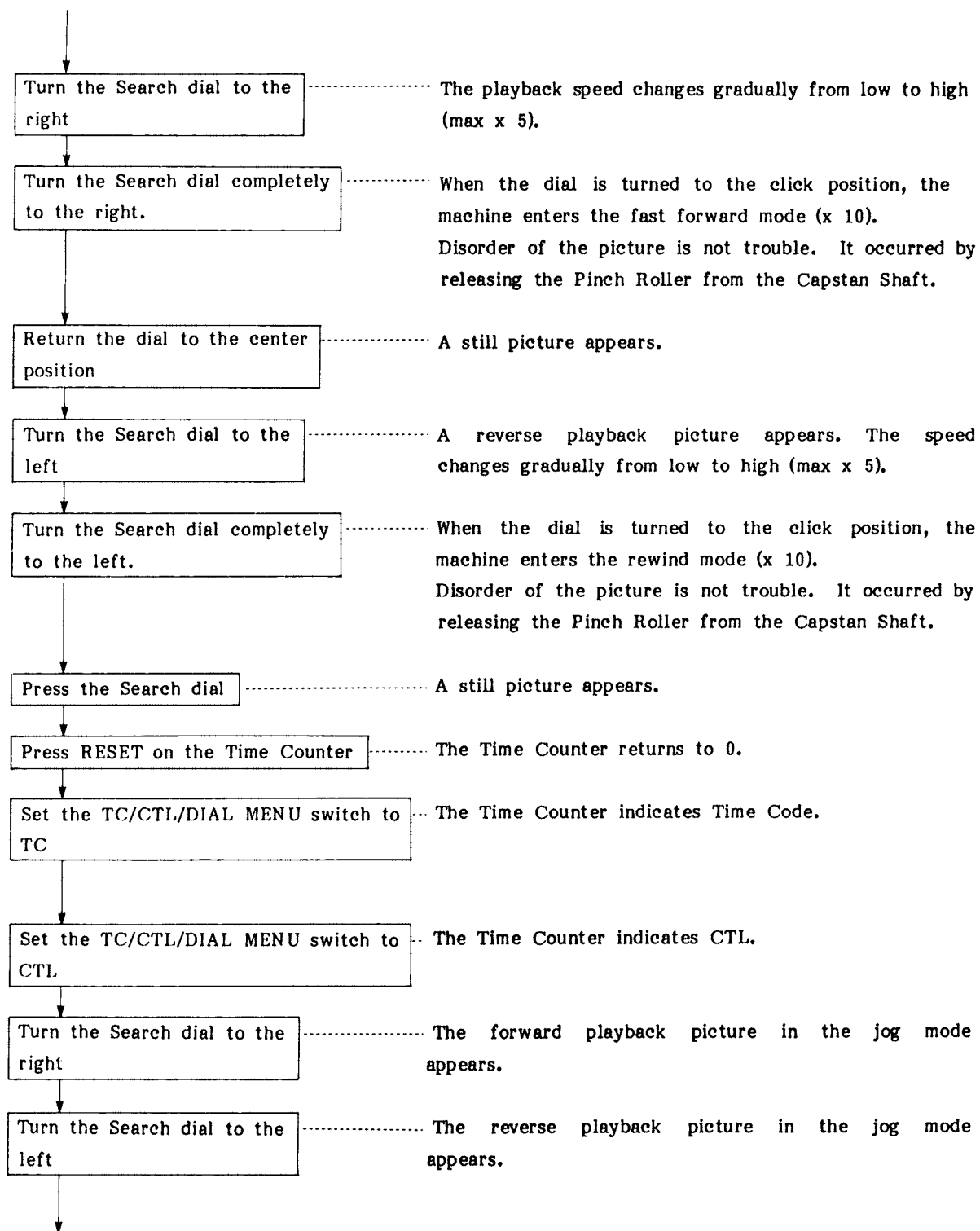
With switches set to :

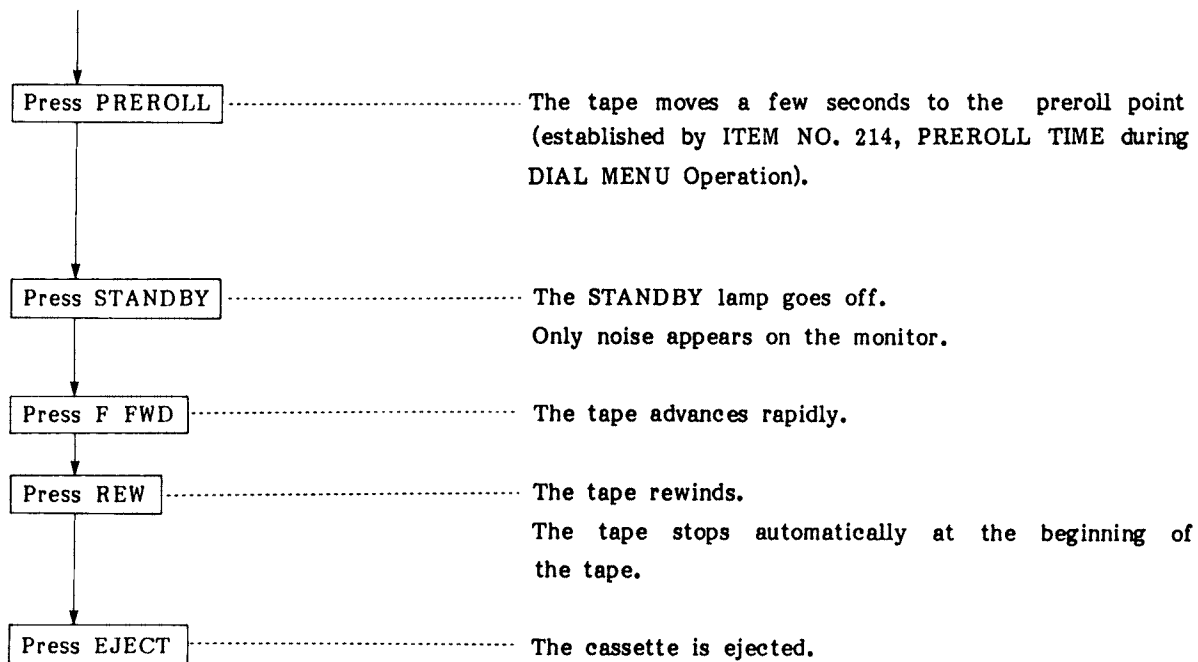
POWER	: ON
REMOTE/LOCAL	: LOCAL
TC/CTL/DIAL MENU	: CTL
AUDIO MONITOR	: MIX
TRACKING	: FIXED
SKEW	: DETENT POINT

Action

Check that







3-2. HOURS METER

The BVU-900 has an hours meter (DIAL MENU Operation, ITEM NO.205 and 206). It is recommended that the hours meter be used as a tool for scheduling periodic maintenance. (Refer to Section 1-6)

3-3. CLEANING PROCEDURE

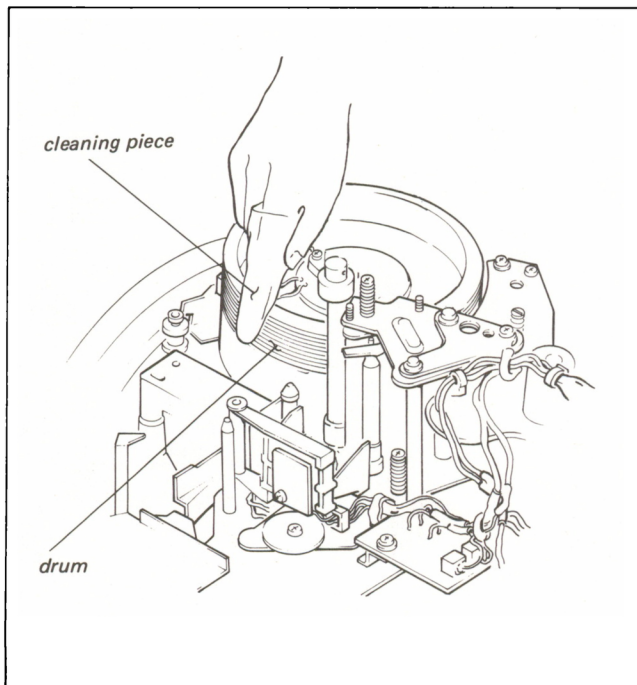
Perform cleaning according to the following procedures. After cleaning, wait until the cleaning fluid completely evaporates before inserting a cassette.

3-3-1. Video Heads

Press the cleaning piece moistened with cleaning fluid lightly against the drum and turn the drum slowly by hand.

(NOTE)

- 1 Never move the cleaning piece in a vertical direction with respect to the head during cleaning.
- 2 Always clean with the power OFF.



3-3-2. Stationary Heads

Clean with cleaning piece moistened with cleaning fluid.

3-3-3. Tape Movement Areas

Clean the tape bearing surface (tape guides, drum, capstan and pinch roller) with cleaning piece moistened with cleaning fluid.

(NOTE)

Do not clean the surface of the condensation sensor on the lower drum with cleaning fluid. Clean this surface with a dry cloth.

3-4. Head Degaussing

It is recommended to demagnetize the Rotary Heads and Stationary Heads with a demagnetizer.

- . Bring the tip of the Demagnetizer as close as possible to the Head Tip without actually contacting it. Draw the Demagnetizer away from the head very slowly. Do not turn OFF the Demagnetizer until it is at least three feet away from the unit.

3-5. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after repair (the unit operating hours are not important):

1. Clean the video heads and stationary heads. (Refer to Section 3-3-1 and 3-3-2)
2. Clean the tape movement area. (Refer to Section 3-3-3)

3-6. PERIODIC CHECK AND MAINTENANCE SCHEDULE

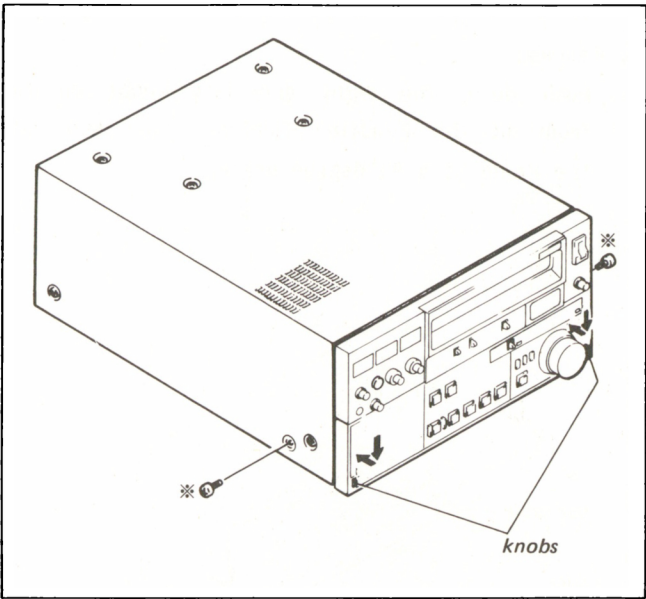
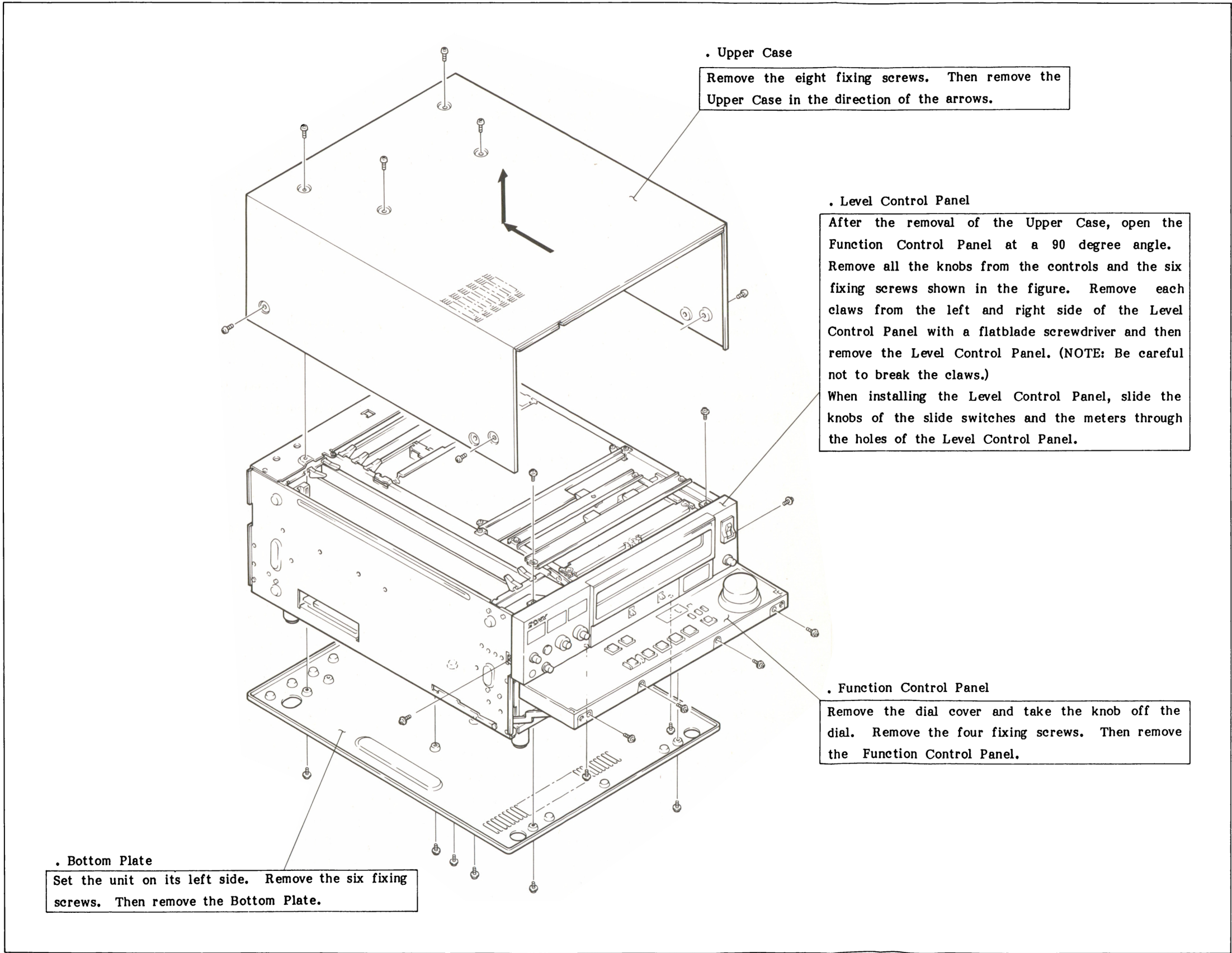
○ : Cleaning ◇ : Check ◆ : Replacement

Item	Operating Hours (H)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
	Replacement Part No.											
Tape path cleaning (including the video heads)	—	○	○	○	○	○	○	○	○	○	○	Perform whenever repair work is attempted.
Replacement of the pinch roller. (When the BVU-900 is used as the editing system.)	A-6750-223-A PINCH ROLLER BLOCK ASSY	○	◆	○	◆	○	◆	○	◆	○	◆	
Replacement of the pinch roller. (When the BVU-900 is used as the playback unit (such as on air).)	A-6750-223-A PINCH ROLLER BLOCK ASSY	○	○	○	◆	○	○	○	◆	○	○	
Replacement of the belt of the threading motor assembly.	3-672-737-01 BELT, SQUARE	○	○	○	○	○	○	○	◆	○	○	
Replacement of the belt of the cassette compartment.	3-653-387-00 BELT, LM	○	○	○	○	○	○	○	◆	○	○	
Replacement of the upper drum.	A-6709-636-A DUR-45-R	○	◆	○	◆	○	◆	○	◆	○	◆	
Check the brake torque (Replacement of the brake shoe.)	X-3668-749-0 HOLDER ASSY, LINING	—	—	—	◇	—	—	—	◆	—	—	

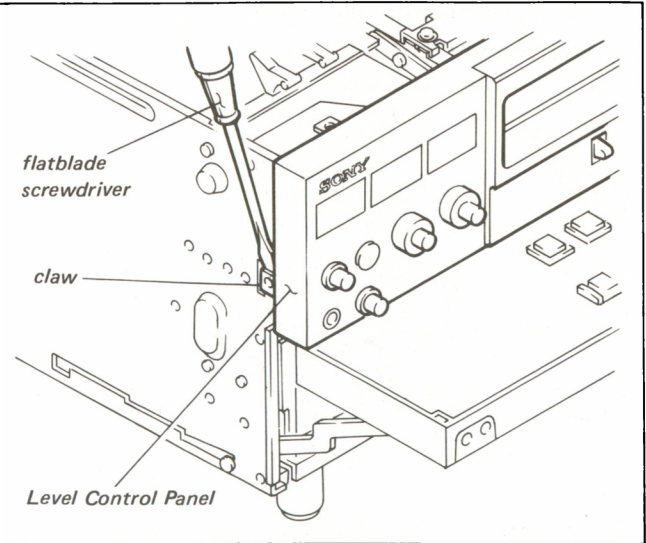
Reel Motor	about 4,000H
Capstan Motor	about 3,000H
Cassette-up Compart Motor	about 30,000 times
Threading Motor	about 30,000 times
Tension Regulator Unit (S)	about 5,000H
Tension Regulator Unit (T)	about 5,000H
Time Code Head	about 4,000H
Audio/CTL Head	about 3,000H
Fan Motor	about 12,000H

SECTION 4 SERVICE INFORMATION

4-1. REMOVAL AND INSTALLATION OF THE CABINET



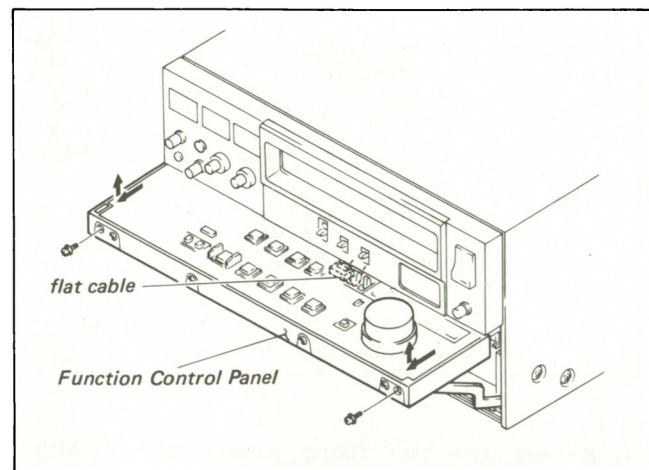
1. Remove the two fixing screws marked with * shown in the figure. These fixing screws secure the Function Control Panel to the unit for transport.
When transporting the unit, release the locks on the arms. Press the knobs on the front of the Function Control Panel in the direction of the arrows shown in the figure and tighten the fixing screws.
2. Remove the each claw on the left and right side of the Level Control Panel with a flatblade screwdriver.



4-2. REMOVAL AND INSTALLATION OF THE FUNCTION CONTROL PANEL

. Removal

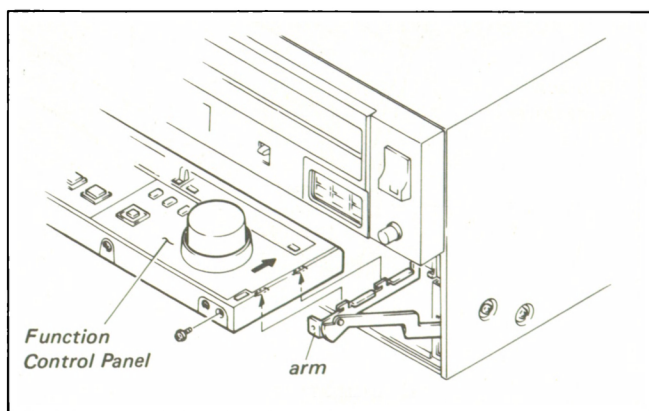
1. Push down the right and left knobs on the front of the Function Control Panel and open the Panel at a 90 degree angle.



2. Disconnect the Flat Cable connected to the back of the Function Control Panel.
3. Remove the two fixing screws from the right and left ends of the Function Control Panel.
4. Slide the Function Control Panel in the direction of the arrows and remove it.

. Installation

5. Install the two hooks on the right and left arms of the unit to the Function Control Panel, and shift the Function Control Panel in the direction of the arrows. Then tighten the two fixing screws.



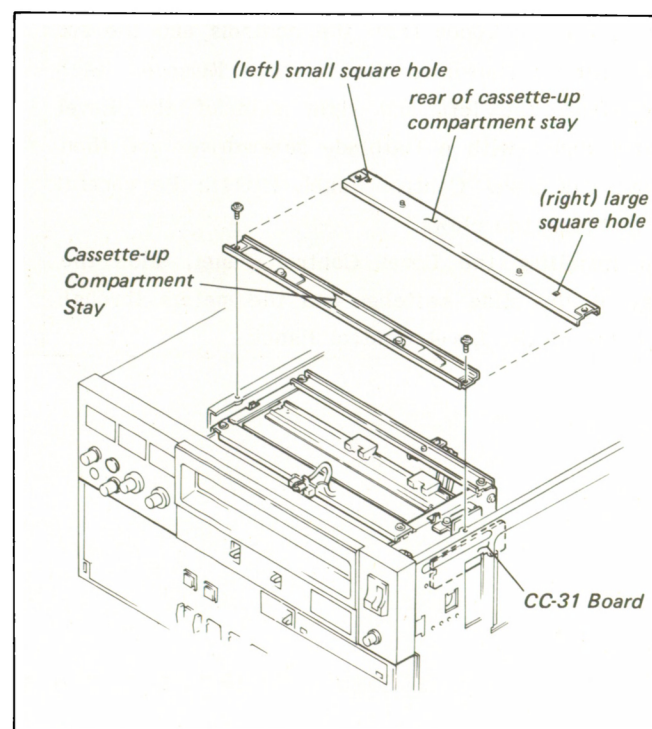
6. Connect the Flat Cable.

4-3. REMOVAL OF THE CASSETTE-UP COMPARTMENT

1. Remove the Upper Case.
2. Remove the two fixing screws and the Cassette-up Compartment Stay.
3. Lift the right side of the Cassette-up Compartment and disconnect connector CN1 on the CC-31 Board. The Cassette-up Compartment can now be removed from the unit.

(NOTE)

When the Cassette-up Compartment Stay is installed, position the right and left ends as shown in the figure.



4-4. SERVICE OF THE SPECIAL PRINTED CIRCUIT BOARDS

4-4-1. REPLACEMENT OF PARTS ON THE HN-80A PRINTED CIRCUIT BOARD

1. Remove the Upper Case.
2. Remove the AP-23, AU-85C and BC-11A Boards.
3. Unsolder and replace parts as necessary.

(NOTE)

Never remove the HN-80A Board from the unit when replacing parts on this Board.

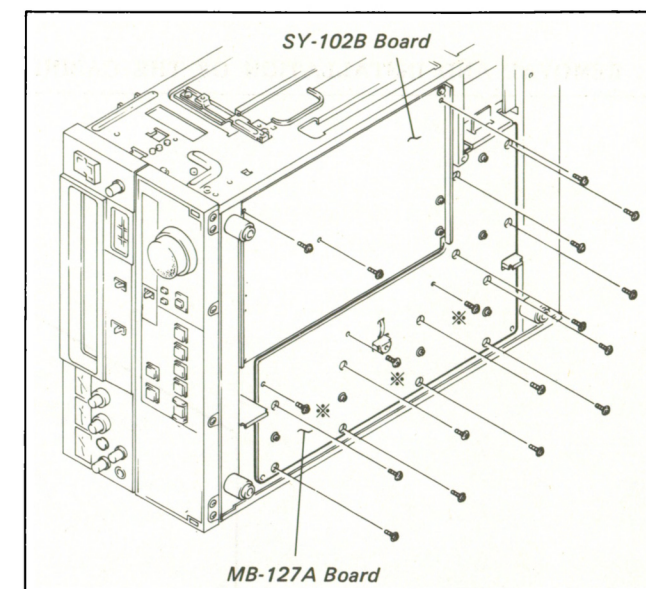
4-4-2. REMOVAL OF THE PD-45 PRINTED CIRCUIT BOARD

1. Remove the Upper Case.
2. Remove the Cassette-up Compartment.
3. Remove the Bottom Plate and then open the SY-102B Board.
4. Disconnect the seven connectors on the PD-45 Board from the bottom of the unit.
5. Disconnect the seven connectors on the PD-45 Board from the top of the unit.
6. Remove the four white fasteners. Pull up the PD-45 Board.
7. Install the PD-45 Board to the unit by reversing steps (1) to (6).

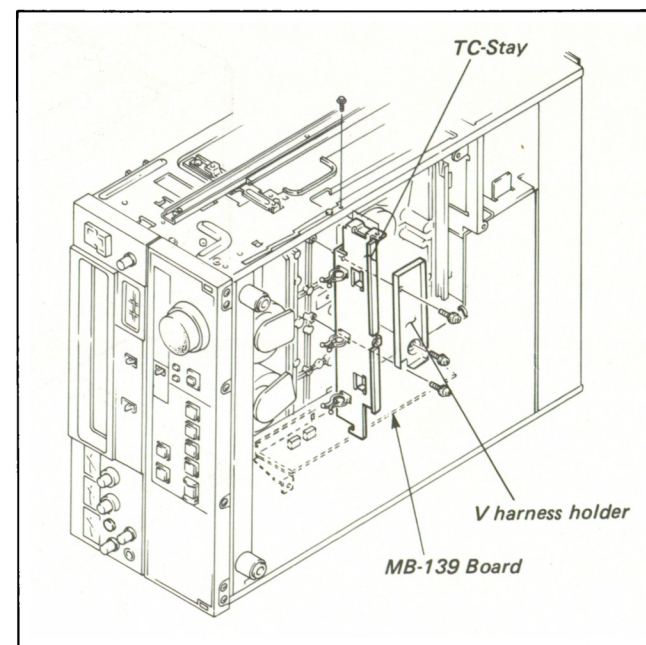
4-4-3. REPLACEMENT OF THE MB-139 PRINTED CIRCUIT BOARD

. Removal

1. Remove the Upper Case and all the plug-in boards.
2. Remove the Bottom Plate and open the SY-102B Board.
3. Disconnect all the connectors on the SY-102B Board and then remove the SY-102B Board.
4. Remove the twelve fixing screws in the holes on the MB-127A Board. (Be careful not to drop the screws into the unit.)



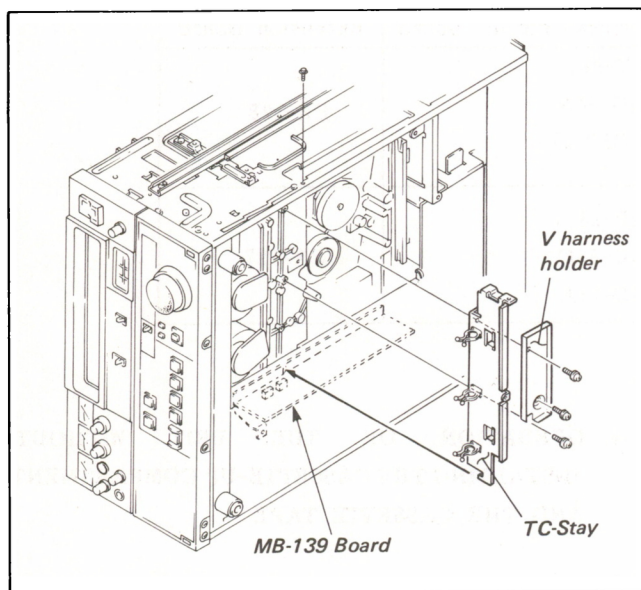
5. Remove the three fixing screws marked with * shown in the figure.
6. Remove the two fixing screws and then remove the V harness holder.
7. Remove the two fixing screws and the TC-Stay.



8. Disconnect the two connectors on the MB-139 Board.
9. Push the MB-139 Board toward the chassis while holding the MB-127A Board. Then disconnect the three connectors between the MB-127A Board and the MB-139 Board and remove the MB-139 Board.

. Installation

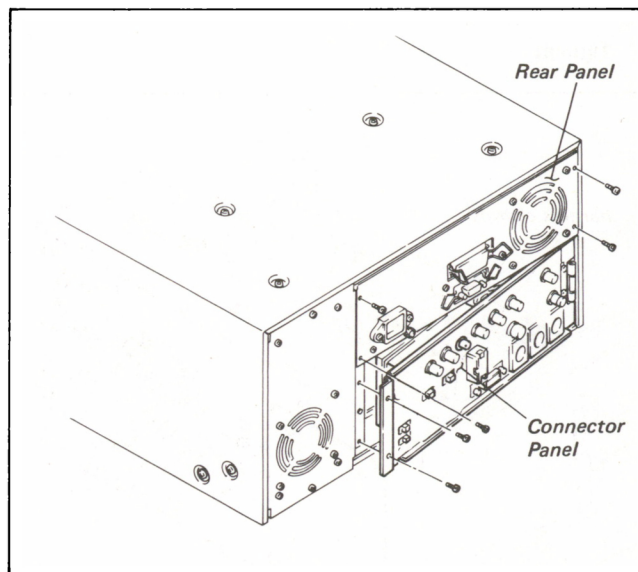
10. Replace the MB-139 Board with a new one and connect the three connectors with the MB-127A Board (CN241 to CN243).
11. Attach the MB-139 Board to the MB-127A board with three fixing screws.
12. Install the MB-127A Board with twelve fixing screws.
13. Attach the TC-Stay. Insert the projection of the TC-Stay in the square hole of the MB-139 Board Bracket as shown in the figure.



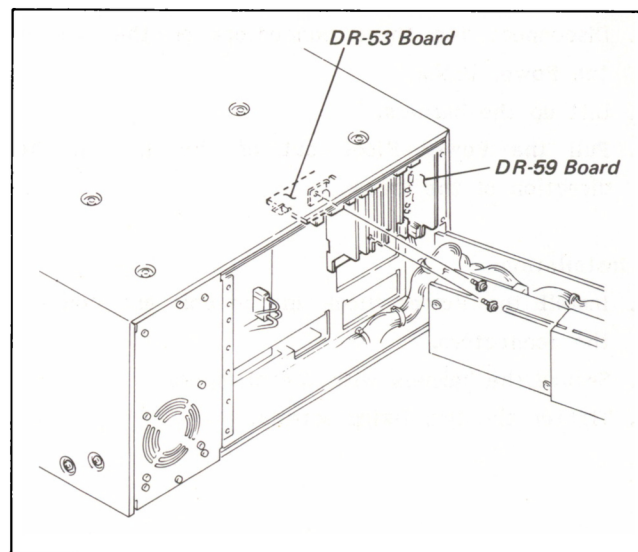
14. Install the V harness holder.
15. Connect the two connectors on the MB-139 Board (CN234, CN235).
16. Connect all the connectors on the SY-102B Board.
17. Install the SY-102B Board.
18. Attach the Bottom Plate.
19. Install the plug-in boards in the appropriate positions.
20. Install the Upper Case.

4-4-4. REMOVAL OF THE DR-53 AND DR-59 PRINTED CIRCUIT BOARDS

1. Remove the two fixing screws and open the Connector Panel.



2. Remove four fixing screws and remove the Rear Panel.
3. Disconnect seven connectors on the DR-53 Board and one connector on the DR-59 Board.

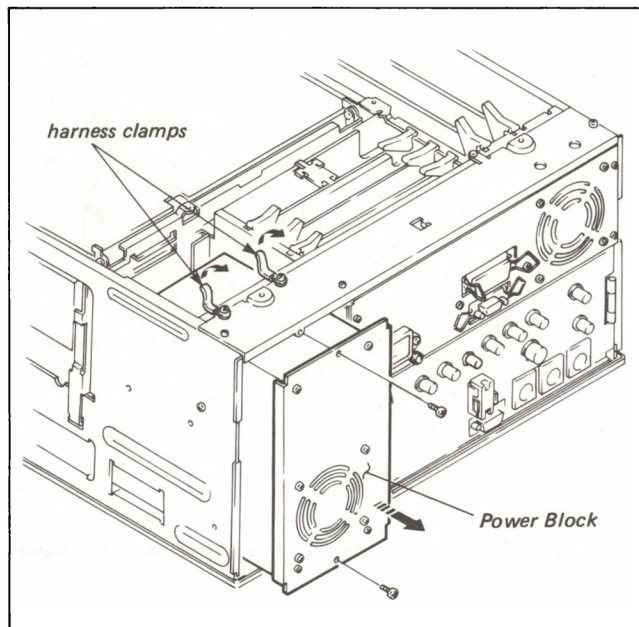


4. Remove the two fixing screws shown in the figure and remove the DR-53 and DR-59 Boards.

4-5. REMOVAL AND INSTALLATION OF THE POWER BLOCK

. Removal

1. Remove the Upper Case.
2. Remove the two fixing screws as shown in the figure.



3. Lift the harness clamps.
4. Disconnect the three connectors on the top of the Power Block.
5. Lift up the harness.
6. Pull the Power Block out of the unit in the direction of the arrow.

. Installation

7. Install the Power Block in the unit and connect the connectors.
8. Secure the harness with the clampers.
9. Tighten the two fixing screws.

4-6. EXTENSION BOARD

The Amp chassis printed circuit boards listed can be serviced by using two kinds of Extension Boards. Simply insert the Extension Board into the Amp chassis and connect the circuit board to be serviced to the end of the Extension Board.

(NOTE)

Be sure to turn OFF power before inserting or removing the Extension Board or printed circuit boards.

Printed circuit board	Extension Board
SV-88C DM-54A (TBC-5)	EX-128
AP-23 AU-85C BC-11A	EX-127

4-7. OPERATION OF THE UNIT WITHOUT INSTALLING THE CASSETTE-UP COMPARTMENT AND THE CASSETTE TAPE

The unit have the tape beginning and tape end sensors so that detect the tape top and tape end. For operating the unit without installing the Cassette-up Compartment and the cassette tape, disable the Tape Beginning Sensor and the Tape End Sensor.

1. Remove the Upper Case. (Refer to Section 4-1)
2. Short between TP10 (location No. F-1) and E1 (A-3) on the SY-102B Board with a shorting clip from the entrance of the Time Code Board.
Tape Beginning Sensor and the Tape End Sensor stop their operation.

(NOTE)

Never forget to remove the shorting clip after the check and adjustment.

If the unit is placed into the F FWD or REW mode without removing the shorting clip, the unit cannot detect the tape beginning or tape end. So the unit cannot operate the AUTO STOP operation. The tape and the unit are put into the dangerous situation.

3. Set the Bit7 of S201 (location No. K-1) on the SV-88C Board to ON and the Bit8 to OFF. Set S202 (M-1) on the SV-88C Board to ON.

(NOTE)

After the check and adjustment, reset S201 and S202.

4. Turn the POWER ON.

The Threading Ring turns automatically, unit is put into the threading completion mode.

5. Press the button as request.

4-8. SPARE PARTS

1. The shaded and -marked components are critical to safety.

Replace only with the same components as specified.

2. Replacement parts supplied from the Sony Parts Center will sometimes have a shape different from the original parts. These differences are for improved parts and/or engineering changes or standardization of genuine parts.
3. This manual's exploded views and electrical spare parts list indicate the part numbers of the standardized genuine parts at the present time. Regarding engineering part changes in our engineering department, refer to Sony service bulletins and service manual supplements.

4-9. FIXTURE

Part Number	Description	Application
J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
J-6001-830-A	Drum Eccentricity Gauge (2)	
J-6001-840-A	Drum Eccentricity Gauge (1)	
J-6001-930-A	Drum Eccentricity Gauge (4)	
J-6009-830-A	Flatness Plate	Stationary head slantness adjustment
J-6026-240-A	Adjustment driver	Electrical alignment
J-6130-010-A	Reel Table Height Check Base Jig	Reel table height adjustment
J-6130-020-A	Reel Table Height Check Jig	
J-6150-140-A	Eccentric Screwdriver (6 mm dia.)	Position adjustment
J-6153-020-A	Dihedral Adjustment Screwdriver	Video head dihedral adjustment
J-6153-720-A	Reel Motor Shaft Slantness Adjustment Jig	Reel motor shaft slantness check and adjustment
J-6153-730-A	Hexagonal Screwdriver (1.27 mm)	Reel table height adjustment
Y-2031-001-0	Cleaning Fluid	Cleaning
2-034-697-00	Cleaning Piece	
3-702-390-01	Eccentric Screwdriver (4 mm dia.)	Position adjustment
3-702-391-01	Eccentric Screwdriver (5 mm dia.)	Stationary head position adjustment
7-700-736-01	L-shaped Hexagonal Wrench (1.27 mm)	
7-700-736-05	L-shaped Hexagonal Wrench (1.5 mm)	
7-723-902-00	Dental Mirror	For tape path adjustment
7-732-050-30	Tension Scale (100 g full scale)	Measurement of back tension and torque
7-732-050-40	Tension Scale (200 g full scale)	
7-732-050-50	Tension Scale (500 g full scale)	
8-960-015-16	Alignment Tape, RR5-4SB	Conventional alignment tape
8-960-037-02	Alignment Tape, RR2-1SD	Tracking, servo, audio and video adjustment
8-960-037-80	Alignment Tape, RR5-1SD	
8-899-999-53	Torque Measurement Tape (100 mm dia.)	Measurement of torque
9-911-053-00	Thickness Gauge	For clearance check
Standard Products	Head Demagnetizer, HE-4	Degaussing of heads

4-10. SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the unit to the customer:

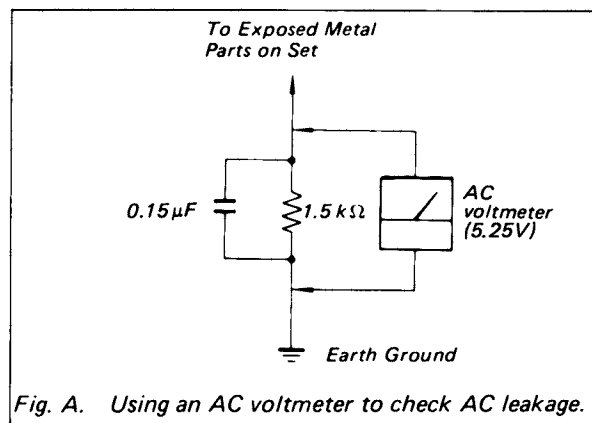
Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

- (1) A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
- (2) A battery-operated AC milliammeter. The Date Precision 245 digital multimeter is suitable for this job.
- (3) Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20V AC range are suitable.

(Refer to Fig. A)



SECTION 5

REPLACEMENT OF MAJOR PARTS

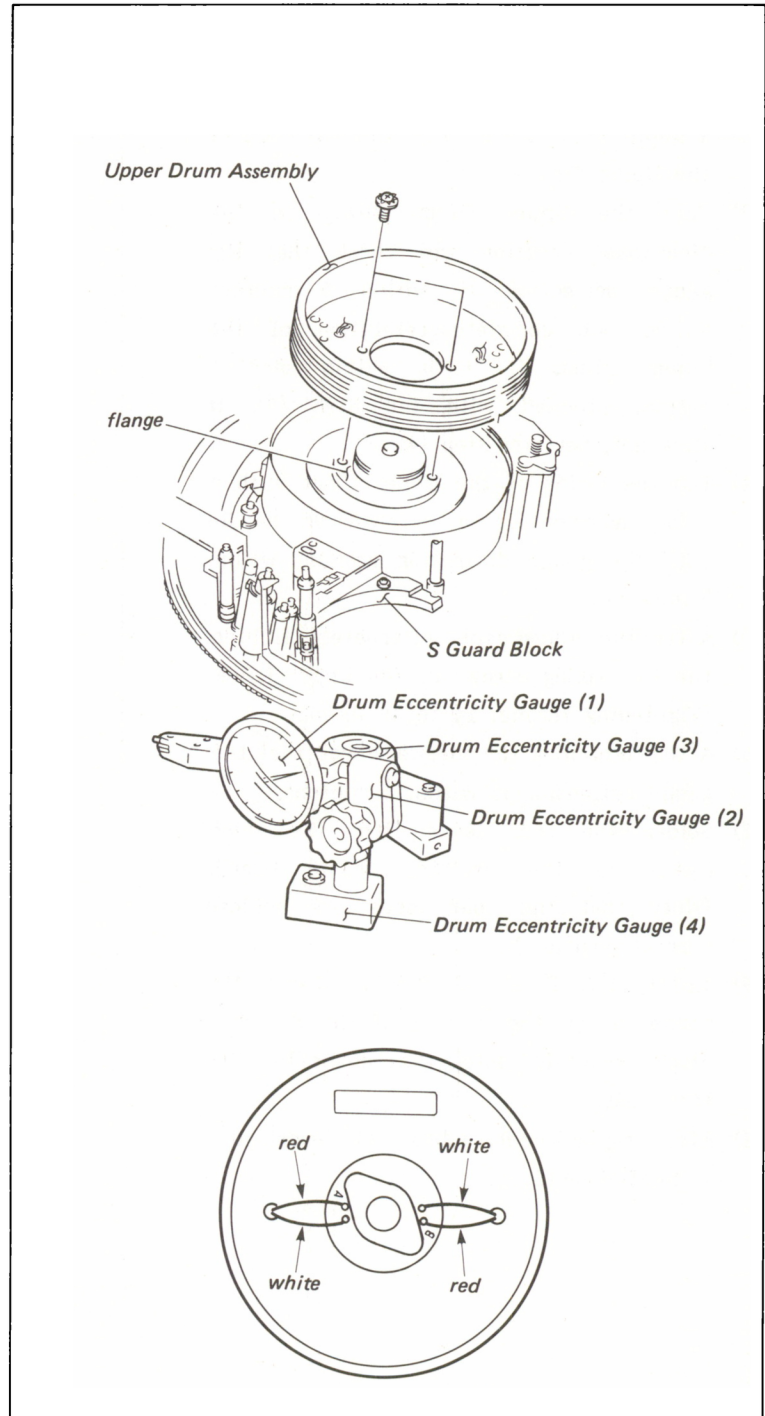
5-1. REPLACEMENT OF THE UPPER DRUM ASSEMBLY

- . The Rotary Video Heads cannot be replaced individually. The entire Upper Drum Assembly should be replaced when any of these heads fails.

Tool: Drum eccentricity gauge (1)
Drum eccentricity gauge (2)
Drum eccentricity gauge (3)
Drum eccentricity gauge (4)

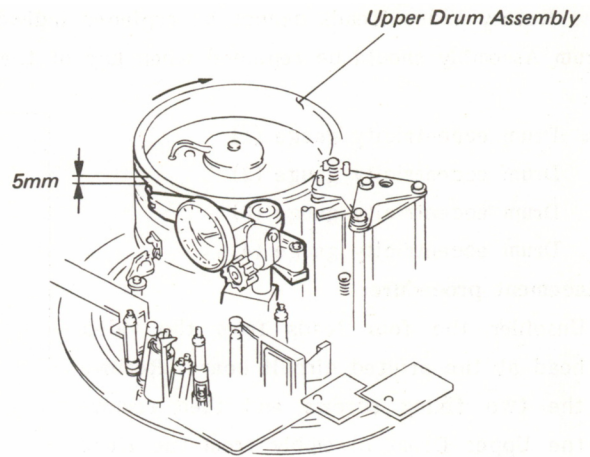
Replacement procedure:

- (1) Unsolder the four leads from the video head at the printed circuit board. Remove the two fixing screws and then remove the Upper Drum Assembly from the Head Drum Assembly.
- (2) Clean the matching surfaces of the flange and new Upper Drum Assembly with a cloth moistened with cleaning fluid. (If there is a spacer between the drum and the flange, it should be left on the flange. If the spacer is lost, correct interchangeability cannot be obtained.)
- (3) Place the Upper Drum Assembly as shown in the figure and thread the two fixing screws snugly but do not tighten them.



Adjustment procedure:

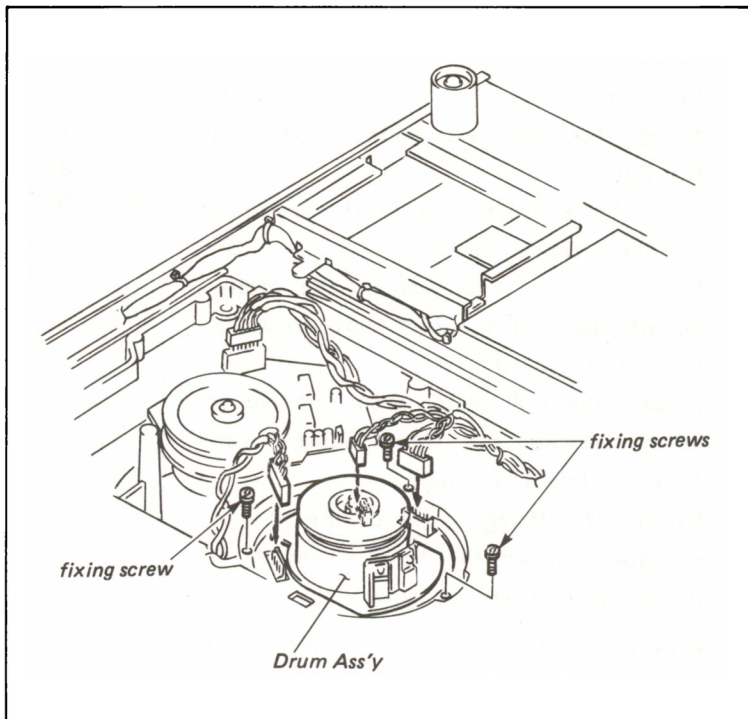
- (1) Remove the S Guard Block. (The connector at the bottom of the S Guard is inserted into the connector on the chassis.)
- (2) Assemble the Drum Eccentricity Gauges (1), (2), (3) and (4) as shown in the figure. Set the assembled gauges on the unit so that the probe tip is positioned at a point about 5 mm from the top edge of the Upper Drum.
- (3) Turn the Upper Drum slowly in the clockwise direction and check that the gauge deflection is within 5 microns during one complete revolution of the Upper Drum. If it is within specification, proceed with the Step (5). If it is not, perform Step (4).
- (4) Tap the inside of the Upper Drum with a nylon hammer or a screwdriver handle until the gauge deflection remains within 5 microns.
- (5) After the adjustment, alternately tighten the two fixing screws of the Upper Drum. (Tightening torque: 14 to 16 kg-cm)
- (6) After tightening the screws, check that the gauge deflection is within 5 microns.
- (7) Solder the four leads from the video heads to the printed circuit board. (Note that the four leads are soldered correct position.)
- (8) Install the S Guard Block. (Insert the connector on the bottom of the S Guard Block securely into the connector on the chassis.)
- (9) After replacement, adjust as described in Section 5-12.



5-2. REPLACEMENT OF THE DRUM ASSEMBLY

Replacement procedure:

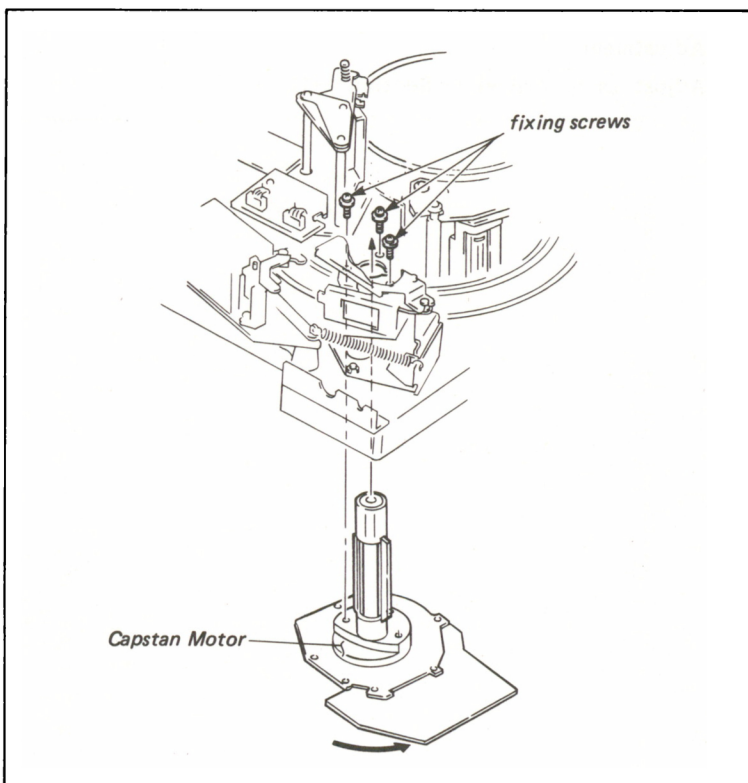
- (1) Open the SY-102B Board after removing the three fixing screws.
- (2) Disconnect the three connectors of the drum assembly from the back of the unit.
- (3) Remove the three fixing screws which hold the drum.
- (4) Install the drum on the base while turning the drum assembly in the counterclockwise direction when viewed from the top of the unit.
- (5) Connect the three connectors.
- (6) Install the SY-102B Board.
- (7) Install the Brush Assembly. Check that the position of the brush is as shown in the figure.
- (8) Adjust as described in Section 5-12.



5-3. REPLACEMENT OF THE CAPSTAN MOTOR

Replacement procedure:

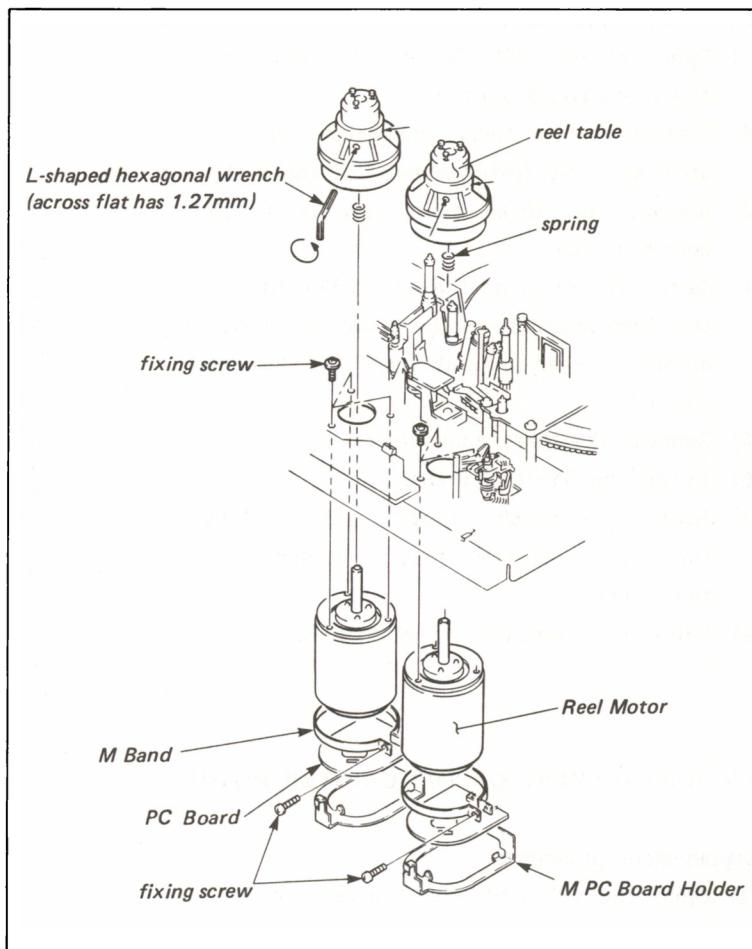
- (1) Open the SY-102B Board after removing the three fixing screws.
- (2) Disconnect the connector of the capstan motor from the back of the unit.
- (3) From the top of the unit, remove the three fixing screws and replace the capstan motor with a new one.
- (4) Position the new capstan motor and thread the three fixing screws snugly but do not tighten them.
- (5) Tighten the three fixing screws while turning the Capstan Motor in the direction of the arrow.
- (6) Connect the connector.
- (7) Install the SY-102B Board.
- (8) Adjust as described in Section 5-12.



5-4. REPLACEMENT OF THE REEL MOTOR

Replacement procedure:

- (1) Loosen the two set screws in the reel table and remove the reel table and the spring from the reel shaft as shown in the figure.
- (2) Open the SY-102B Board after removing the three fixing screws.
- (3) Disconnect the connector of the printed circuit board of the reel motor from the back of the unit.
- (4) Remove the reel motor from the chassis after removing the three fixing screws from the top of the unit.
- (5) Remove the fixing screw of the M Band and then remove the M Band and M PC Board Holder from the motor.
- (6) Unsolder the printed circuit board from the reel motor.
- (7) Replace the reel motor. Remove the spacer from between the reel motor and chassis. This spacer is used for Section 6-1-3, Reel Motor Shaft Slantness Adjustment.
- (8) Adjust as described in Section 5-12.

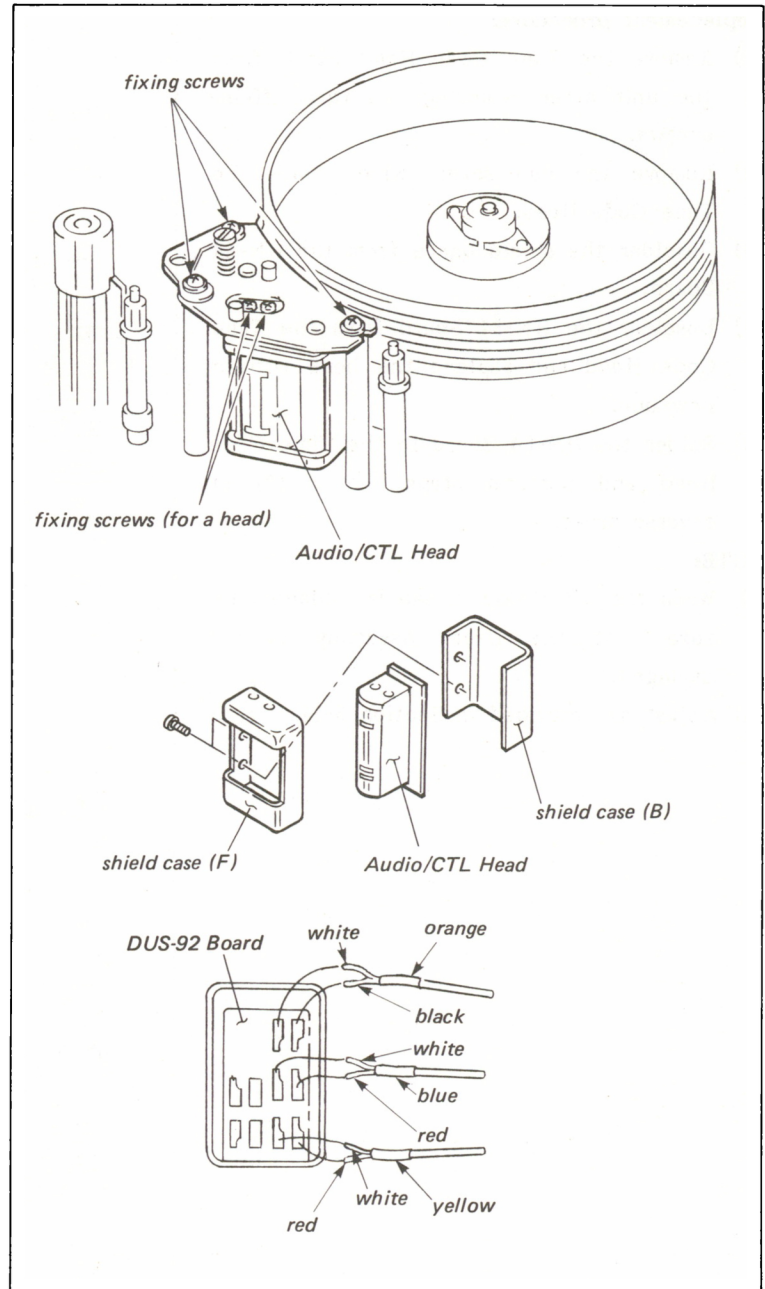


5-5. REPLACEMENT OF THE HEAD

5-5-1. Replacement of the Audio/CTL Head

Replacement procedure:

- (1) Remove the Audio/CTL Head Block from the unit after removing the three fixing screws as shown in the figure.
- (2) Remove the Audio/CTL Head and the shield case (F and B) after removing the two fixing screws as shown in the figure.
- (3) Remove the two fixing screws from the shield case.
- (4) Unsolder the six leads from the printed circuit board and remove the DUS-92 Board from the head.
- (5) Replace the head with a new one and solder the leads to the DUS-92 Board as shown in the figure.
- (6) Perform steps (1) to (3) in reverse order.
- (7) Adjust as described in Section 5-12.



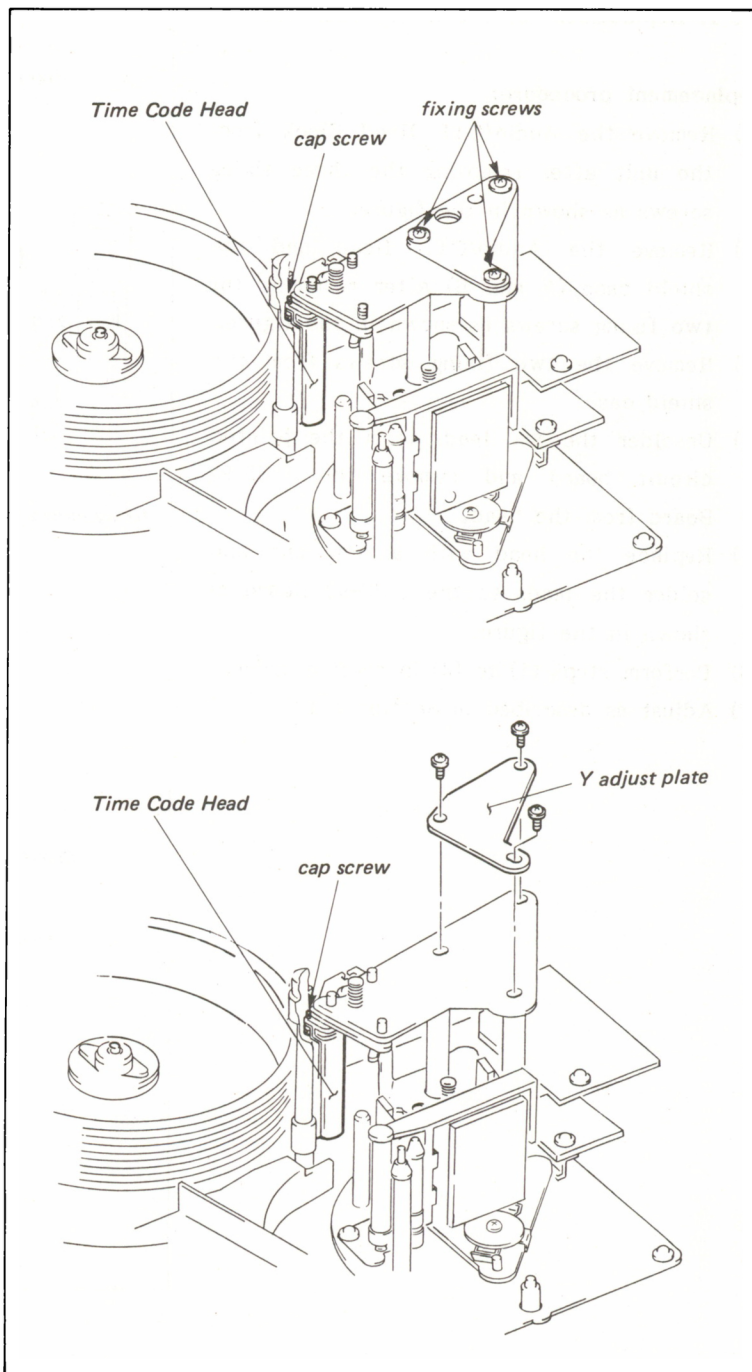
5-5-2. Replacement of the Time Code Head

Replacement procedure:

- (1) Remove the Time Code Head Block from the unit after removing the three fixing screws.
- (2) Remove the cap screw which holds the Time Code Head.
- (3) Unsolder the shield board from the HN-84 Board.
- (4) Unsolder the HN-84 Board from the Time Code Head and replace the head with a new one.
- (5) Solder the HN-84 Board to the Time Code Head and perform steps (1) to (3) in reverse order.

NOTE:

- (i) When the Time Code Head is replaced, be sure that the Drum Assembly is not damaged.
- (6) Adjust as described in Section 5-12.

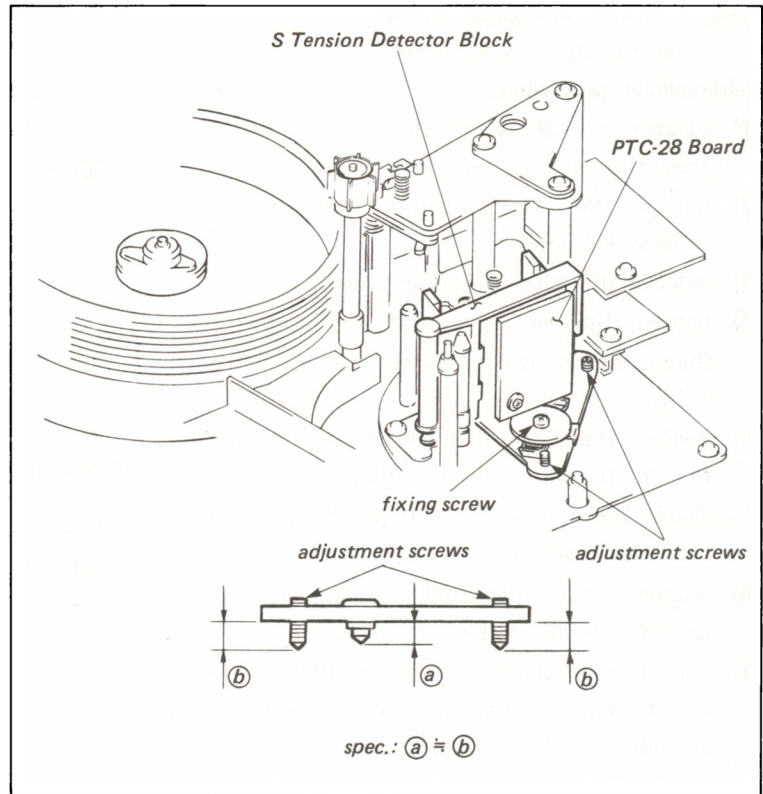


5-6. REPLACEMENT OF THE TENSION DETECTOR BLOCK

5-6-1. Replacement of the S Tension Detector

Replacement procedure:

- (1) Disconnect CN410 on the PD-45 Board.
- (2) Remove the S Tension Detector Block from the unit after removing the fixing screw.
- (3) Check that the adjustment screws of the new detector meet the required specification as shown in the figure.
- (4) Install the S Tension Detector Block to the unit. (Tightening torque: 5 to 7 kg-cm)
- (5) Adjust as described in Section 5-12.

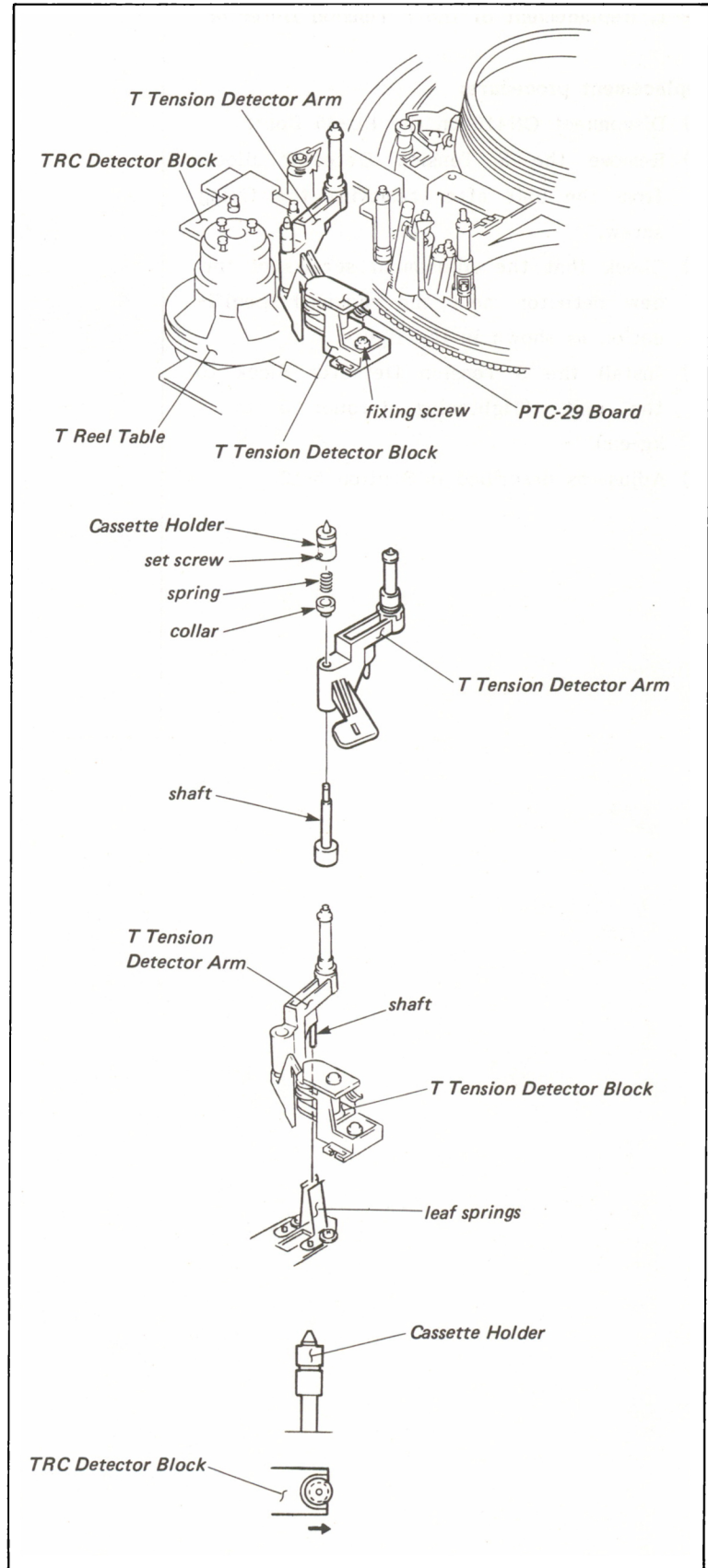


5-6-2. Replacement of the T Tension Detetector

Tool: L-shaped hexagonal wrench
(across flat has 1.5 mm)

Replacement procedure:

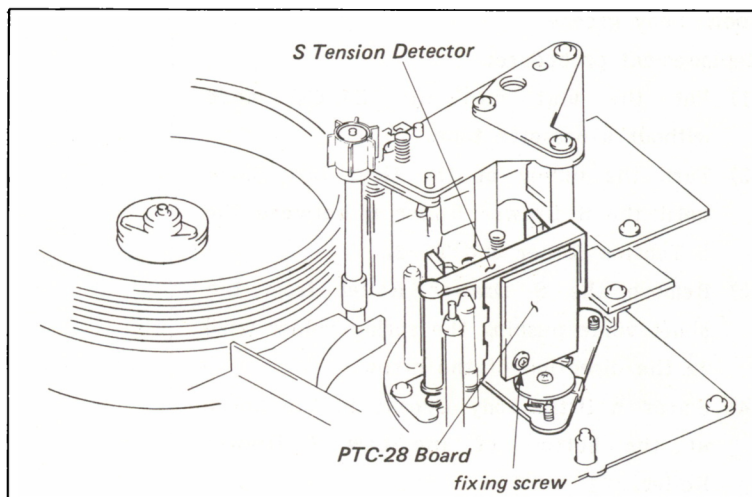
- (1) Disconnect CN234 on the MB-139 Board from the back of the unit.
- (2) Remove the fixing screw from the T Tension Detector.
- (3) Remove the TRC Detector Block.
- (4) Loosen the set screw of the Cassette Guide Block and remove the Cassette Holder.
- (5) Remove the T Tension Regulator Arm and the T Tension Detector Block from the shaft. (Note that there is a spring and a collar as shown in the figure.)
- (6) Replace the defective parts of the detector block with a new one.
- (7) Join the T Tension Detector Block with the T Tension Regulator Arm and put the assembly on the shaft. Be sure that the shaft of the tension detector is between the two Leaf Springs as shown in the figure.
- (8) Put the collar, spring and the Cassette Holder on the shaft.
- (9) Tighten the fixing screw and install the T Tension Detector to the unit.
- (10) Connect CN234 on the MB-139 Board from the back of the unit.
- (11) Position the notch of the TRC Detector Block in the groove of the Cassette Holder. While pushing the TRC Detector Block in the direction of the arrow, install it on the unit.
- (12) Adjust as described in Section 5-12.



5-6-3. Replacement of the CdS of the S Tension Detector

Replacement procedure:

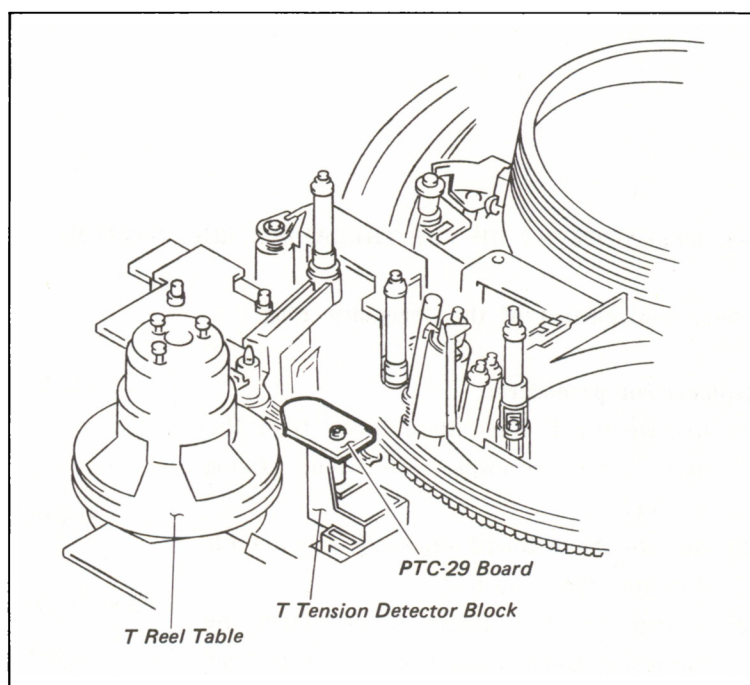
- (1) Remove the PTC-28 Board from the S Tension Detector Block.
- (2) Replace the CdS with a new one.
- (3) Adjust as described in Section 5-12.



5-6-4. Replacement of the CdS of the T Tension Detector

Replacement procedure:

- (1) Remove the PTC-29 Board from the T Tension Detector Block.
- (2) Replace the CdS with a new one.
- (3) Adjust as described in Section 5-12.

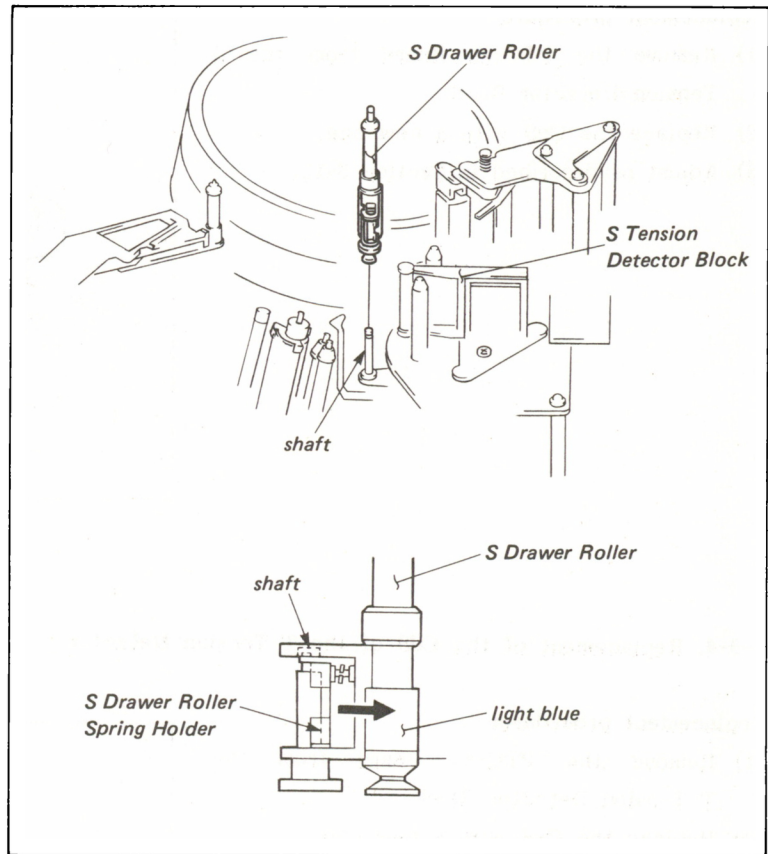


5-7. REPLACEMENT OF THE S DRAWER ROLLER

Tool: Sony grease

Replacement procedure:

- (1) Put the unit into the EJECT mode without a cassette tape.
- (2) Turn the pulley of the Gear Box Block until the S Drawer Roller is between the S Tension Roller and TG-2.
- (3) Remove the S Drawer Roller from the shaft while pushing the spring holder (red) in the direction of the arrow.
- (4) Smear a little Sony Grease in the notch at the bottom of the new S Drawer Roller.
- (5) While pushing the spring holder in the direction of the arrow, slide the new S Drawer Roller down the shaft until the S Drawer Roller locks to the shaft.
- (6) Adjust as described in Section 5-12.

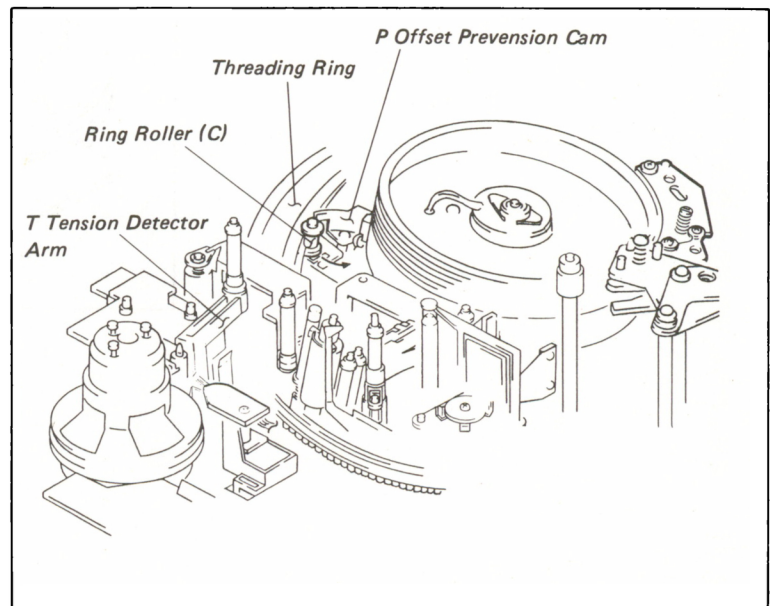


5-8. REPLACEMENT OF THE THREADING RING SYSTEM

5-8-1. Replacement of the Threading Ring

Replacement procedure:

- (1) Remove the E Head Base Block from the unit after removing the four fixing screws.
- (2) Remove the S Guard Assembly and the FR Detector from the unit.
- (3) Loosen the two fixing screws from the Threading Gear Block and remove it from the Threading Ring.
- (4) Loosen the fixing screw and then move the Ring Roller (C) and the P Offset Prevention Cam in the direction of the arrow.
- (5) Remove the Threading Ring from the unit and replace it with a new one.
- (6) Perform steps (1) to (4) in reverse order.
- (7) Adjust as described in Section 5-12.



5-8-2. Replacement / Adjustment of the TG-5 and TG-6

. There are three tape guides on the Threading Ring. The replacement procedure for two of the guides (TG-5 and TG-6) is different from that of the Threading Guide.

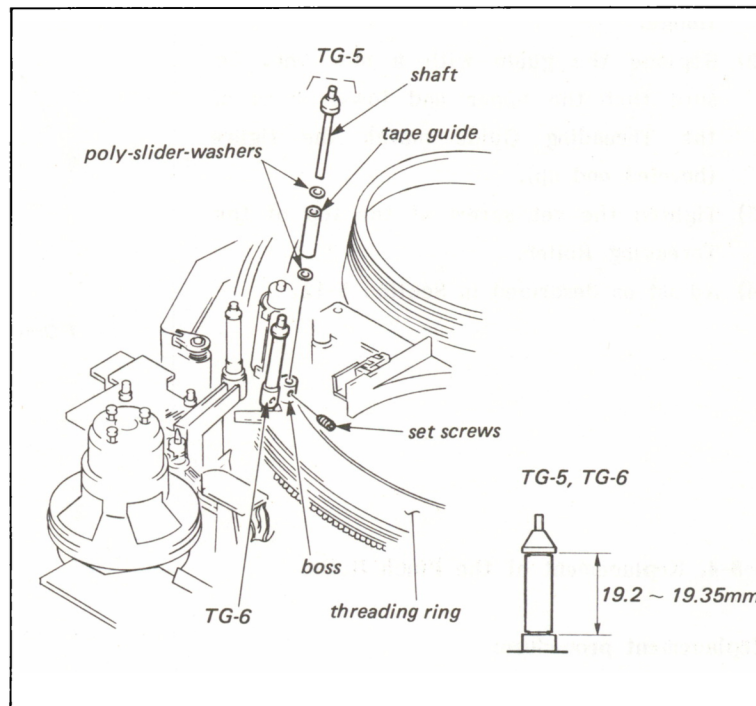
Tool: L-shaped hexagonal wrench

(across flat has 1.27 mm)

Slide vernier callipers or equivalent

Replacement procedure:

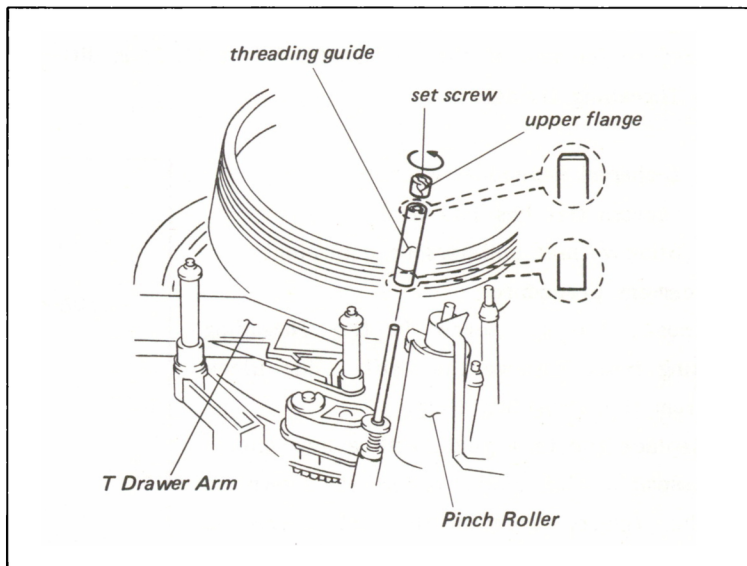
- (1) Loosen the set screw in the Threading Ring boss. Remove the Tape Guide Block from the Threading Ring.
- (2) Replace the tape guide with a new one.
- (3) Assemble the guide roller as shown in the figure. Tighten the set screw of the boss so that the clearance between the upper flange and the boss to meets the required specification. Check that the guide roller turns smoothly.
- (4) Insert a cassette tape and put the unit into the PLAY mode. Check that the tape runs along the upper flange of the new tape guide without curling.
- (5) Adjust as described in Section 5-12.



5-8-3. Replacement / Adjustment of the Threading Roller

Replacement procedure:

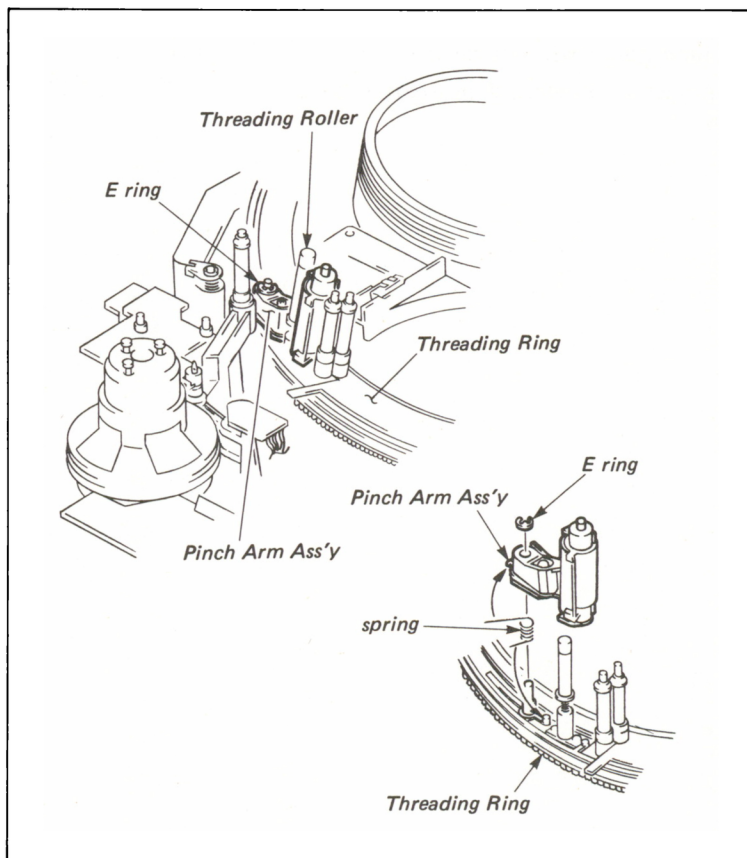
- (1) Loosen the set screw in the upper flange of the Threading Roller. Remove the Threading Roller by turning the upper flange.
- (2) Replace the guide with a new one. Be sure that the upper and lower sides of the Threading Guide match the figure (beveled end up).
- (3) Tighten the set screw at the top of the Threading Roller.
- (4) Adjust as described in Section 5-12.



5-8-4. Replacement of the Pinch Roller

Replacement procedure:

- (1) Turn the pulley of the Gear Box until the S Drawer Roller comes near the Entrance Guide.
- (2) Remove the Pinch Arm Assembly from the Threading Ring after removing the E ring.
- (3) Replace the Pinch Roller Assembly with a new one.
- (4) Install the Pinch Roller Assembly on the Threading Ring as shown in the figure.
- (5) Adjust as described in Section 5-12.

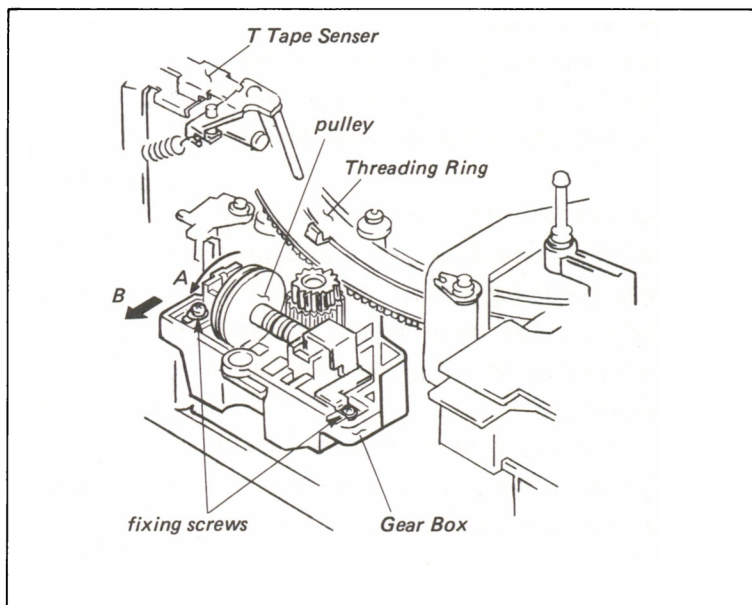


5-9. REPLACEMENT OF THE THREADING GEAR BOX SYSTEM

5-9-1. Replacement of the Threading Gear Box

Replacement procedure:

- (1) Put the unit into the EJECT mode and turn the power OFF.
- (2) Remove the T Tape Sensor from the gear box after removing the fixing screw.
- (3) Remove the two fixing screws of the gear box after turning the pulley 1 revolution in the direction of arrow A. Move the gear box in the direction of arrow B and remove it from the unit.
- (4) Remove the harness from the clamper and disconnect CN511 from the HN-80A Board.
- (5) Replace the gear box with a new one.
- (6) Perform steps (3) and (4) in reverse order.
- (7) Put the gear box on the chassis and thread the two fixing screws snugly but do not tighten them. Tighten the two fixing screws of the gear box after meshing the Threading Ring to the gear.
- (8) Adjust as described in Section 5-12.

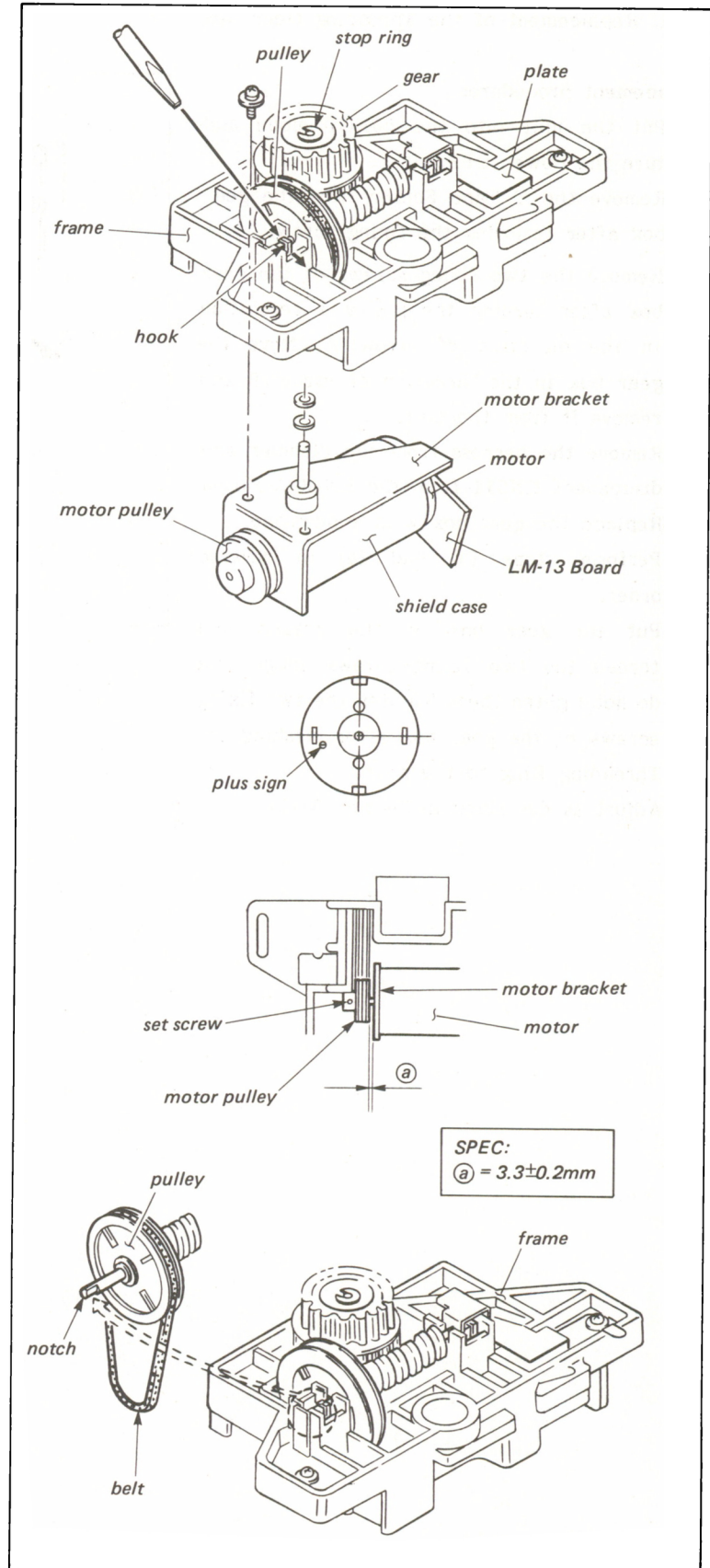


5-9-2. Replacement of the Threading Motor

Tool: L-shaped hexagonal wrench
(across flat has 1.5 mm)

Replacement procedure:

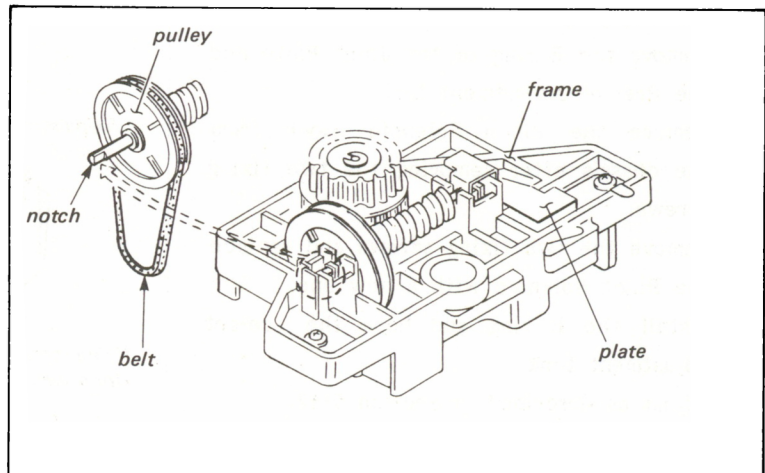
- (1) Perform steps (1) to (4) of Section 5-9-1, Replacement of the Threading Gear Box.
- (2) Remove the gear after removing the stop ring.
- (3) Remove the belt from the motor pulley. Remove the plate from the frame after removing the fixing screw.
- (4) Remove the pulley while pushing the hook in the direction of the arrow as shown in the figure.
- (5) Remove the motor block from the frame after removing the two fixing screws.
- (6) Loosen the set screw and remove the motor pulley.
- (7) Remove the motor from the motor bracket after removing the two fixing screws.
- (8) Remove the shield case and unsolder the LM-13 Board. Replace the motor with a new one.
- (9) The pole of the motor is as shown in the figure. Solder the plus terminal of the motor to the plus pad of the LM-13 Board.
- (10) Install the shield case to the motor.
- (11) Install the motor to the frame as shown in the figure. Perform steps (4) to (6) in reverse order. Check that the clearance between the motor pulley and the bracket meets the required specification.
- (12) Hook the belt to the pulley and install the pulley on the frame. Be sure that the orientation of the notch of the pulley shaft is as shown in the figure.
- (13) Hook the belt to the motor pulley. Check that the belt is not twisted.
- (14) Check as described in Section 5-12.



5-9-3. Replacement of the Threading Belt

Replacement procedure:

- (1) Perform steps (1) to (3) in Section 5-9-2, Replacement of the Threading Motor.
- (2) Clean the new belt and the groove of the pulley with a cloth moistened with cleaning fluid.
- (3) Hook the belt to the pulley and install them to the frame. Be sure that the orientation of the notch of the pulley shaft is as shown in the figure.
- (4) Install the plate to the frame and hook the belt to the Motor pulley. Check that the belt is not twisted.
- (5) Check as described in Section 5-12.

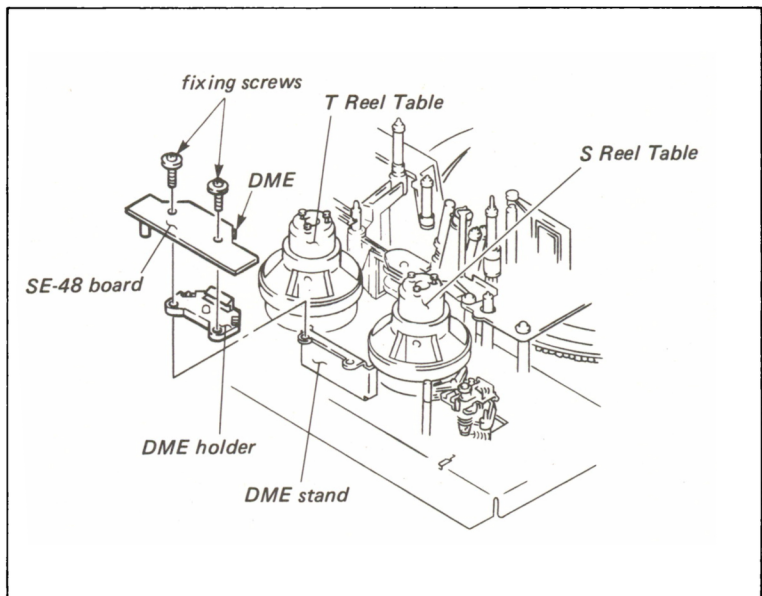


5-10. REPLACEMENT OF THE REEL TABLE ROTATION DETECTOR BLOCK

Mode: EJECT completion mode

Replacement procedure:

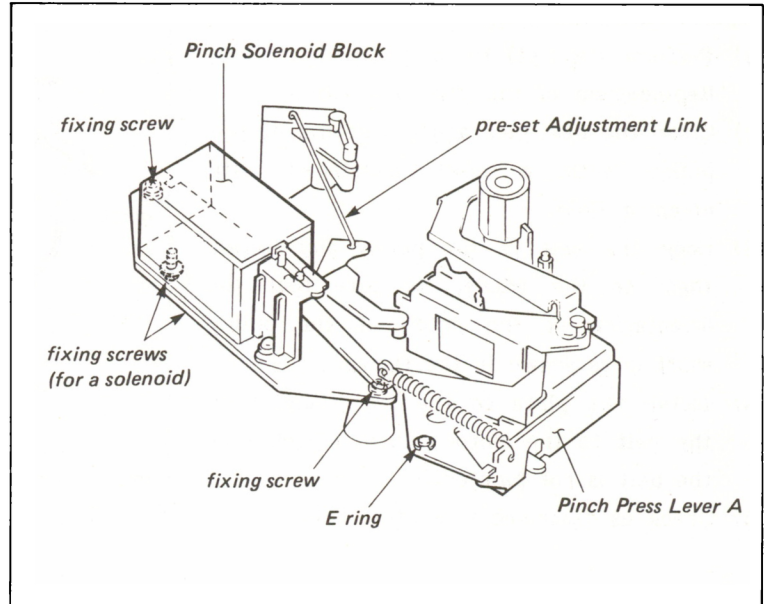
- (1) Remove the SE-48 Board from the DME stand after removing the two fixing screws.
- (2) Remove the DME holder from the SE-48 Board.
- (3) Replace the DME with a new one. When the DME is mounted, note that the leads of the DME are not bent.
- (4) Install the DME holder to the SE-48 Board and install them to the DME stand with two fixing screws.
- (5) Adjust as described in Section 5-12.



5-11. REPLACEMENT OF THE PINCH SOLENOID

Replacement procedure:

- (1) Remove the E ring of the Joint Plate and the Pre-set Adjustment Link.
- (2) Remove the Pinch Solenoid Block from the chassis after removing the two fixing screws.
- (3) Remove the two fixing screws and replace the Pinch Solenoid with a new one.
- (4) Install the E ring and hook the Pre-set Adjustment Link.
- (5) Adjust as described in Section 5-12.



5-12. ITEMS TO BE ADJUSTED AFTER MAIN PARTS REPLACEMENT

(Numbers in parentheses refer to Section Nos.)

Replacement of the Threading Ring

Threading Ring Rotation Adjustment (6-5-1) → Gear Box Installing Position Adjustment (6-5-2) →
FR Detector Installing Position Adjustment (6-5-4) → Pinch Roller Self Alignment Adjustment (6-5-3) →
Pinch Lever Preset Adjustment (6-6-1) → Pinch Roller Preset Adjustment (6-6-2) → Sub Brake
Release Adjustment (7-3-2) → Leaf Spring Position Adjustment (6-12) → FF/REW Mode Tape Path
Adjustment (8-4) → FWD X 5 / REV X 5 Serch Mode Tape Path Adjustment (8-5) → PLAY Mode Tape
Path Adjustment (1) (8-2) → PLAY Mode Tape Path Adjustment (2) (8-3) → T Correction Guide
Slantness Adjustment (8-1) → Video Tracking Adjustment (check) (8-8-1) → Audio/CTL Head
Position Adjustment (8-8-5) → Time Code Head Position Adjustment (8-8-7)

Replacement of the Pinch Roller

Pinch Roller Self Alignment Adjustment (6-5-3) → Pinch Roller Preset Adjustment (6-6-2) → PLAY
Mode Tape Path Adjustment (2) (8-3) → FF/REW Mode Tape Path Adjustment (8-4) → FWD X 5 /
REV X 5 Serch Mode Tape Path Adjustment (8-5) → Video Tracking Adjustment (check) (8-8-1)

Replacement of the Reel Table

Reel Table Height Adjustment (6-1-2) → Reel Table Rotation Detector Block Position Adjustment
(6-10) → S Brake Torque Adjustment (7-1) or T Brake Torque Adjustment (7-2) → Sub Brake
Adjustment (7-3) (Only when the S Reel Table is replaced.) → Video Tracking Adjustment (check) (8-8-1)

Replacement of the Capstan Motor

Pinch Solenoid Block Position Adjustment (6-6-4) → PLAY Mode Tape Path Adjustment (1) (8-2) →
PLAY Mode Tape Path Adjustment (2) (8-3) → FF/REW Mode Tape Path Adjustment (8-4) → FWD X 5 /
REV X 5 Search Mode Tape Path Adjustment (8-5) → Video Tracking Adjustment (8-8-1) → Capstan Servo
System Adjustment

Replacement of the Threading Gear Box, Threading Motor and the Threading Belt

Gear Box Installing Position Adjustment (6-5-2)

Replacement of the Reel Motor

Reel Motor Shaft Slantness Adjustment (6-1-3) → Reel Table Height Adjustment (6-1-2) →
Brake Solenoid Position Adjustment (6-9) (6-9-1 or 6-9-2) → Reel Table Rotation Detector Block
Position Adjustment (6-10) → S Reel Motor Current Sensitive Adjustment (7-4-1) or T Reel Motor
Current Sensitive Adjustment (7-4-2) → S Brake Torque Adjustment (7-1) or T Brake Torque Adjustment (7-2)
→ Sub Brake Adjustment (7-3) (Only when the S Reel Motor is replaced.) → FWD Back Tension
Adjustment (7-5) → Video Tracking Adjustment (check) (8-8-1) → Reel Servo System Adjustment

Replacement of the Audio / CTL Head

T Tape Sensor Position Adjustment (6-7) → Tracking Adjustment (8-8) → Audio System Adjustment

Replacement of the Drum Assembly

FWD Back Tension Adjustment (7-5) → Tracking Adjustment (8-8) → Video Head Dihedral Adjustment (8-9)
→ Switching Position Adjustment (8-8-8) → Drum Phase Adjustment (8-8-9) → Servo System Adjustment
→ Video System Adjustment

Replacement of the Upper Drum

Upper Drum Eccentricity Adjustment —————> FWD Back Tension Adjustment (7-5) —————> Tracking Adjustment (8-8)
—————> Video Head Dihedral Adjustment (8-9) —————> Switching Position Adjustment (8-8-8) —————> Drum Phase
Adjustment (8-8-9) —————> Video System Adjustment

Replacement of the Reel Table Rotation Detector Block

Reel Table Rotation Detector Block Position Adjustment (6-10)

Replacement of the S Drawer Roller

S Drawer Roller Block Limiter Adjustment (6-8) —————> Video Tracking Adjustment (check) (8-8-1)

Replacement of the T Tension Detector CdS

T Tension Detector Operating Point Adjustment (6-4-3) —————> Reel Servo Adjustment

Replacement of the S Tension Detector CdS

S Tension Detector Operating Point Adjustment (6-3-2) —————> Reel Servo Adjustment

Replacement of the Time Code Head

Time Code Head Adjustment (8-7) —————> Tracking Adjustment (8-8) —————> Time Code System Adjustment

Replacement of the Threading Guide

PLAY Mode Tape Path Adjustment (2) (8-3) —————> FF/REW Mode Tape Path Adjustment (8-4) —————>
FWD X 5 / REV X 5 Search Mode Tape Path Adjustment (8-5)

Replacement of the TG-5 and TG-6

T Correction Guide Slantness Adjustment (8-1) —————> PLAY Mode Tape Path Adjustment (1) (8-2)
—————> PLAY Mode Tape Path Adjustment (2) (8-3)

Replacement of the T Tension Detector

T Tension Detector Adjustment (6-4) —————> Video Tracking Adjustment (check) (8-8-1) —————> Reel Servo
Adjustment

Replacement of the S Tension Detector

S Tension Detector Adjustment (6-3) —————> Video Tracking Adjustment (check) (8-8-1) —————> Reel Servo
Adjustment

Replacement of the Pinch Solenoid

Pinch Solenoid Installing Position Adjustment (6-6-3) —————> Pinch Lever Preset Adjustment (6-6-1)
—————> Pinch Roller Self Alignment Adjustment (6-5-3) —————> Pinch Roller Preset Adjustment (6-6-2)
—————> Pinch Solenoid Block Position Adjustment (6-6-4)

SECTION 6

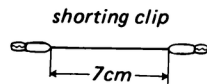
LINK AND DRIVE SYSTEM ALIGNMENT

ALIGNMENT INFORMATION

1. Operation of the unit without installing the cassette-up compartment and tape

- (1) Short between TP10 and E1 of the SY-102B Board with a shorting clip from the entrance of the Time Code Board.

(The clip will disable the Tape Beginning and Tape End Sensors.)



- (2) Set the Bit 7 of S201 on the SV-88C Board to ON and check that the Bit 8 is set to OFF. Set S202 on the SV-88C Board to ON.

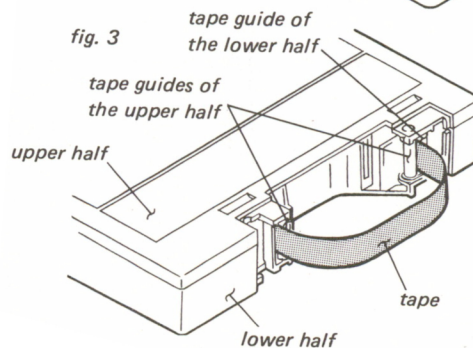
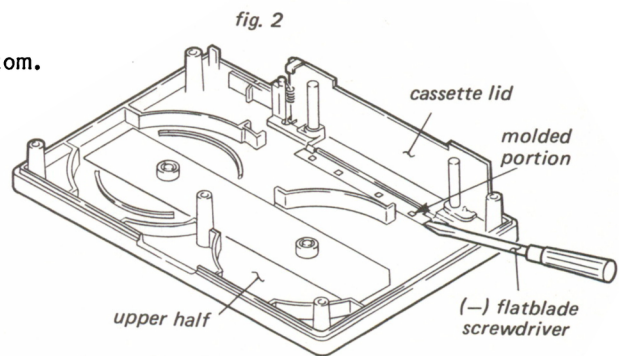
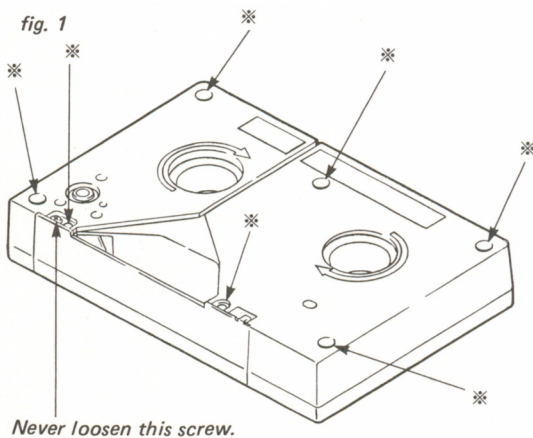
NOTE : After check and adjustment, reset S201 and S202 on the SV-88C Board and remove the shorting clip from the SY-102B Board.

- (3) Turn the power ON. The Threading Ring turns automatically, unit is put into the Threading completion mode.
- (4) Press the button as request.

2. How to make a cassette tape without a lid

. A cassette tape without a lid is used for Section 6-2-1, T Drawer Arm Position Adjustment. Make a cassette tape without a lid as follows:

- (1) Remove the * marked seven screws on the back of the cassette as shown in the figure, and remove the upper half of the cassette. (fig. 1)
- (2) Remove the molded portions of the cassette lid in the upper half with a flatblade screwdriver. (fig. 2)
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half. At this time, properly position the two tape guides in the upper half with respect to the cassette tape. (fig. 3)
- (5) Tighten the seven screws of the cassette tape from the bottom.



6-1. REEL TABLE SYSTEM ADJUSTMENT

6-1-1. Cassette Holder Position Adjustment

Tool: Reel table height check base jig

Thickness gauge

L-shaped hexagonal wrench

(across flat has 1.27 mm)

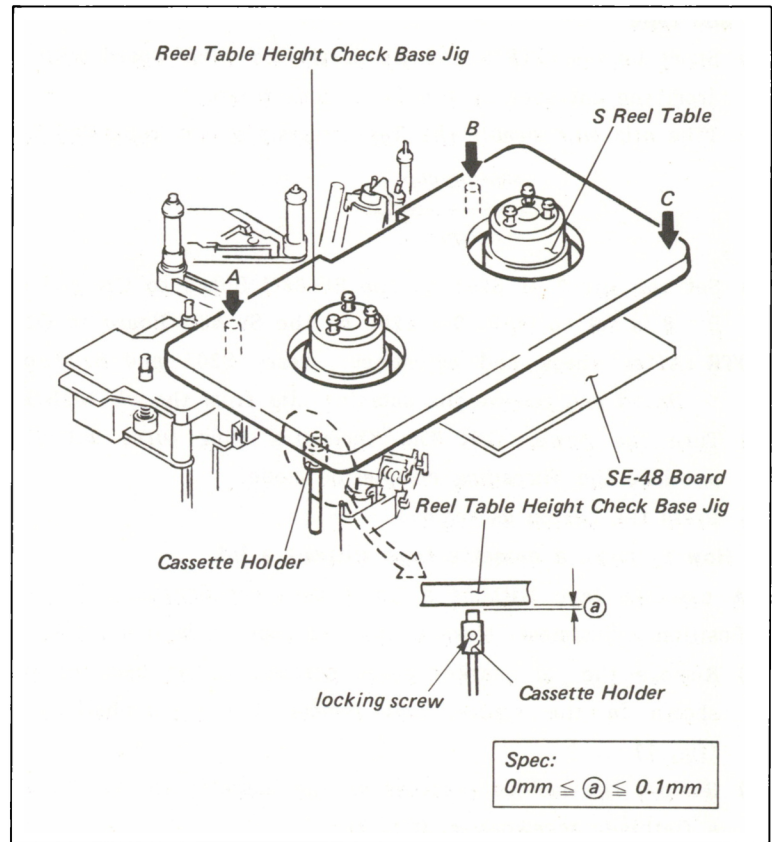
Mode: EJECT completion mode

Check procedure:

- (1) While lightly pushing the Reel Table Height Check Base Jig marked (A), (B) and (C) toward the chassis, check that the clearance between the base jig and the Cassette Holder meets the required specification.

Adjustment procedure:

- (1) Adjust the position of the Cassette Holder to meet the required specification.



6-1-2. Reel Table Height Adjustment

. The height of the reel table is the reference for the tape threading system and the tape path system. This Adjustment should be performed very carefully.

Tool: Reel table height check base jig
Reel table height check jig
Hexagonal screwdriver
(across flat has 1.27 mm)

Mode: EJECT completion mode

Check procedure:

- (1) The probes of the Reel Table Height Check Jig marked "SO" and "TO" can slide over the reel table, leaving a clearance between the jig and the reel table. The probes marked "SX" and "TX" meet the flange and cannot slide over the reel table.
.Use the "SO" and "SX" probes for the Supply Reel Table.
.Use the "TO" and "TX" probes for the Take-up Reel Table.

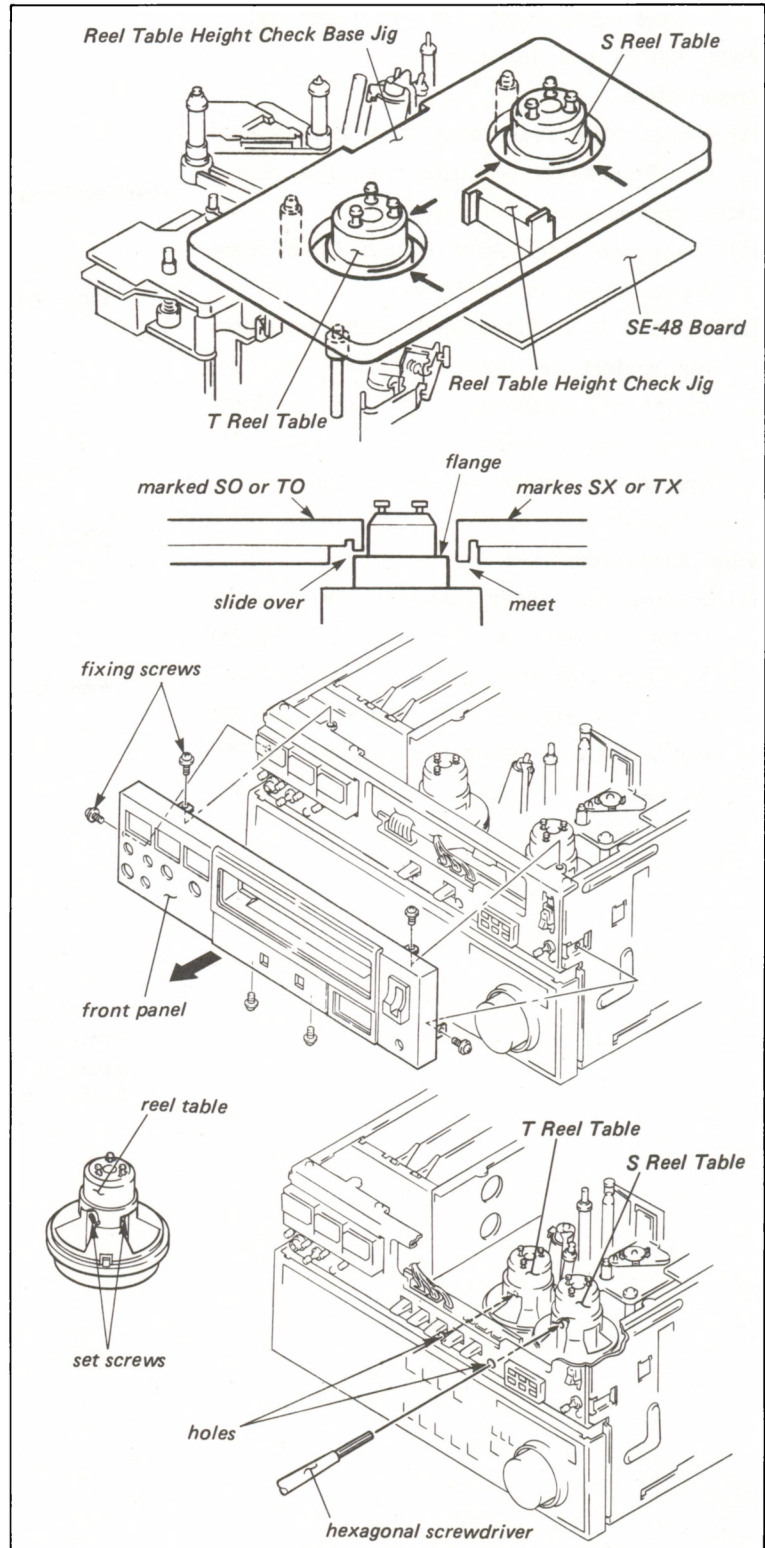
Adjustment procedure:

. Supply Reel Table

- (1) Remove the front panel and insert a hexagonal screwdriver in the hole of the chassis as shown in the figure. Loosen the two set screws in the S Reel Table 1 to 2 turns. (The reel table is pushed up because a spring is under the reel table.)
- (2) While pressing down the reel table, adjust the height to meet the required specification. After adjustment, install the front panel to the unit.

. Take-up Reel Table

- (3) Remove the front panel and insert a hexagonal screwdriver in the hole of the chassis as shown in the figure. Loosen the two set screws in the T Reel Table 1 to 2 turns. (The reel table is pushed up because a spring is under the reel table.)
- (2) While pressing down the reel table, adjust the height to meet the required specification. After adjustment, install the front panel to the unit.



6-1-3. Reel Motor Shaft Slantness Adjustment

This adjustment is required only when the reel motor is replaced or removed.

Tool: Reel table height check base jig
Reel motor shaft slantness check jig

Mode: EJECT completion mode

Preparation:

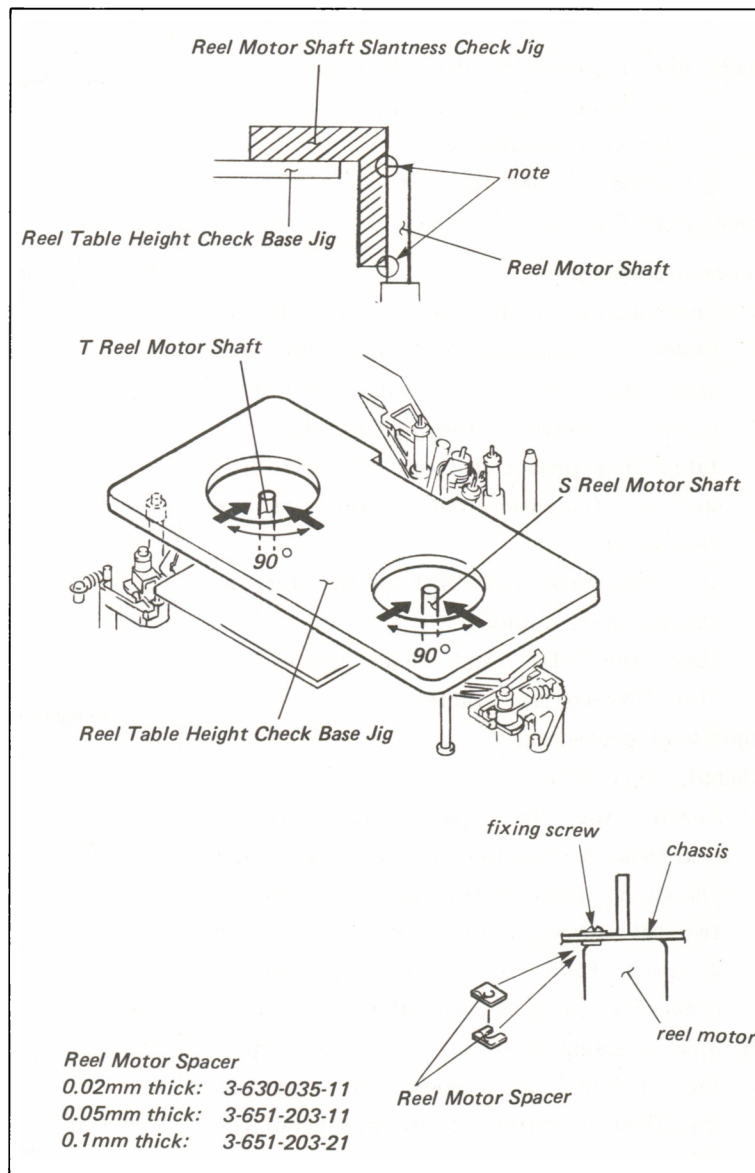
- (1) Remove the reel table from the side of the Reel Motor requiring the adjustment.

Check procedure:

- (1) Place the Reel Table Height Check Base Jig as shown in the figure.
- (2) Set the Reel Motor Shaft Slantness Check Jig against the reel motor shaft from two directions as shown in the figure. Check that there is little clearance between the top or the bottom of the jig and the reel motor shaft.

Adjustment procedure:

- (1) Remove the three fixing screws of the motor. Insert a Reel Motor Spacer between the reel motor and the chassis and then adjust the slantness of the motor shaft to meet the required specification.



6-2. T DRAWER ARM BLOCK ADJUSTMENT

6-2-1. T Drawer Arm EJECT Position Adjustment

Tool: Cassette tape without a lid (Refer to the Alignment Information.)

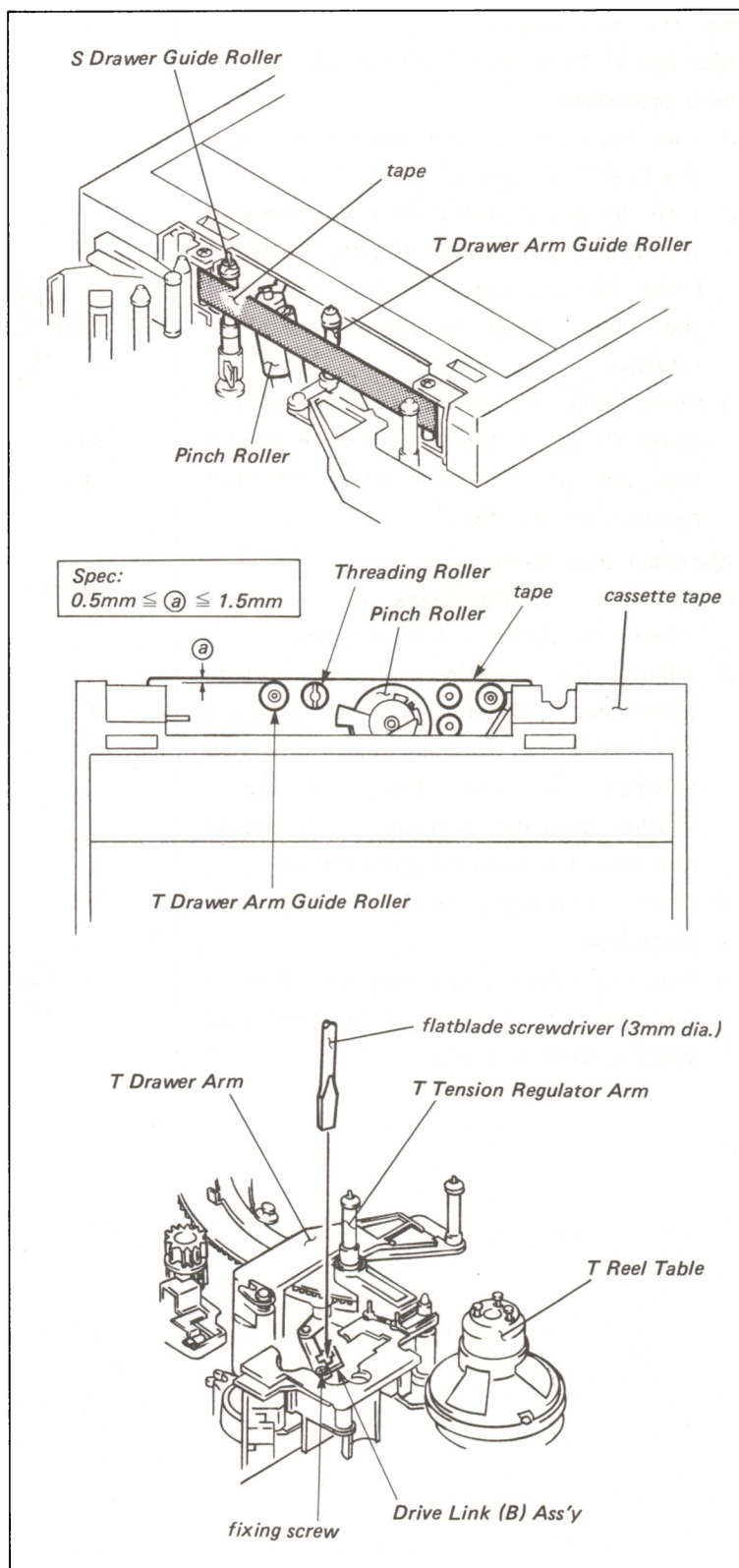
Mode: EJECT completion mode

Check procedure:

- (1) Insert the cassette tape without a lid and put the unit into the threading mode. Press the EJECT button and put the unit into the EJECT completion mode.
- (2) Turn the power OFF.
- (3) Check that the clearance between the guide roller of the T Drawer Arm and a tape meets the required specification.

Adjustment procedure:

- (1) Perform check procedures (1) and (2).
- (2) Loosen the fixing screw of the Drive Link (B) Assembly $1/4$ to $1/2$ turn. Adjust the position of the Drive Link (B) Assembly to meet the required specification.
- (3) Tighten the fixing screw and check that the position of the Drive Link (B) Assembly meets the required specification.



6-2-2. Unthread End Switch Position Adjustment

. Install the cassette-up compartment to the unit for this adjustment.

Tool: Thickness gauge

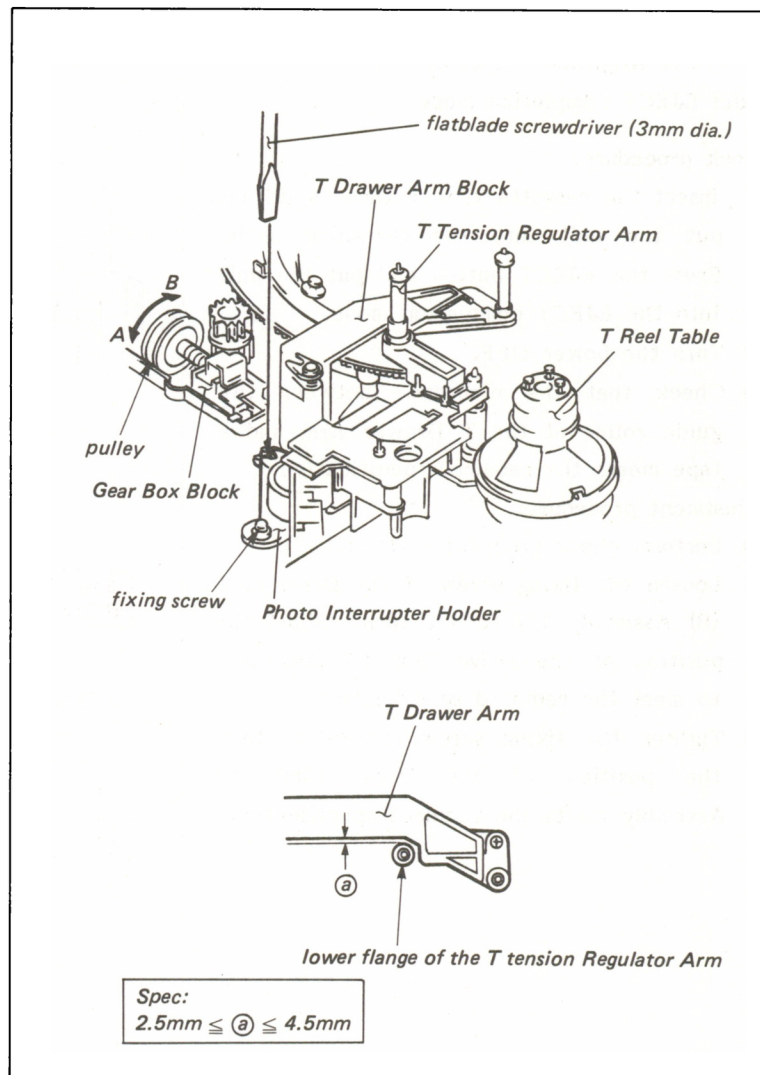
Mode: EJECT completion / POWER ON mode

Check procedure:

- (1) Turn the power ON and put the unit into the EJECT completion mode.
- (2) Turn the pulley of the Gear Box Block in the direction of arrow A until the the T Brake Solenoid clicks. At this time, hold the pulley firmly by hand to stop its rotation.
- (3) Check that the clearance between the lower flange of the T Tension Regulator Arm and the T Drawer Arm meets the required specification.

Adjustment procedure:

- (1) Loosen the fixing screw of the Photo Interrupter Holder 1/4 to 1/2 turn.
- (2) Adjust the position of the Photo Interrupter Holder with a flatblade screwdriver (3 mm dia.) until clearance between the lower flange of the T Tension Regulator Arm and the T Drawer Arm meet the required specification.
- (3) After adjustment, perform the check procedure.
- (4) Turn the pulley of the Gear Box Block in the direction of arrow B by hand until the T Drawer Arm stops.



6-3. S TENSION DETECTOR ADJUSTMENT

6-3-1. S Tension Detector Roller Azimuth / Zenith Adjustment

Tool: Flatness plate

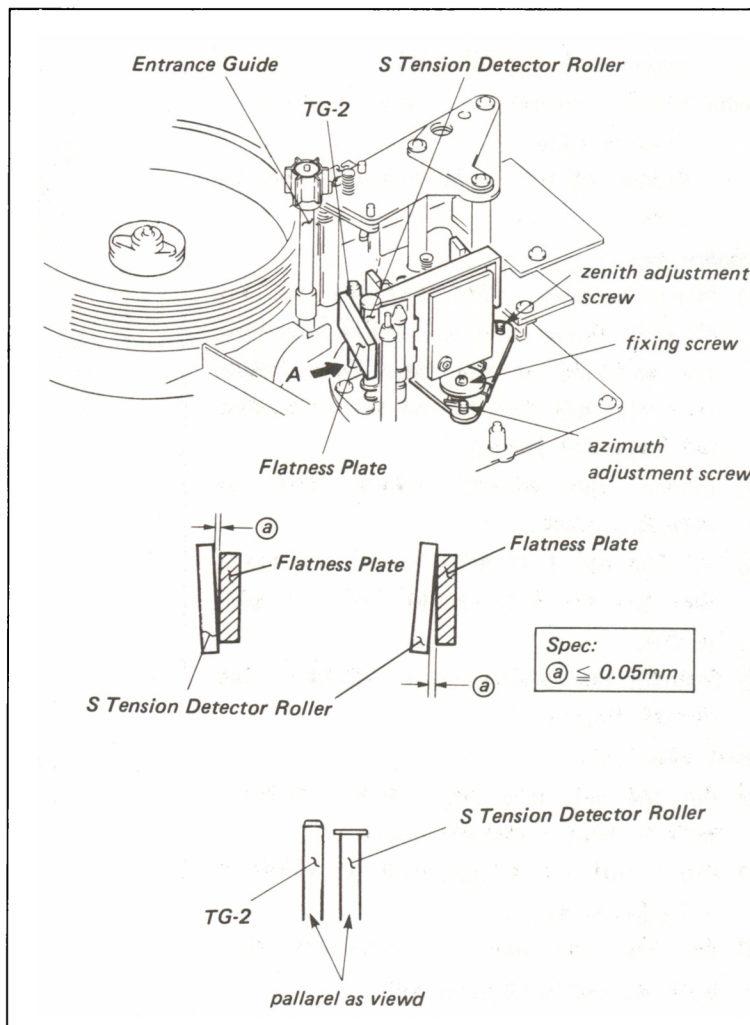
Mood: EJECT completion mode

Check procedure:

- (1) Hold the Flatness Plate against the TG-2 as shown in the figure and touch the Flatness Plate lightly against the S Tension Detector Roller. Check that the clearance between the detector roller and the Flatness Plate meets the required specification.
- (2) As viewed from the direction of arrow A, check that the S Tension detector roller is parallel to TG-1.

Adjustment procedure:

- (1) Loosen the fixing screw 1 to 2 turns.
- (2) Adjust the azimuth and the zenith adjustment screws of the S Tension Detector Roller to meet the required specifications.
- (3) Tighten the fixing screw and perform the check procedure.



6-3-2. S Tension Detector Operating Point Adjustment

Tool: Oscilloscope

Eccentric screwdriver (4 ϕ)

Tension scale (100g full scale)

Extension board (EX-128)

Mode: EJECT completion mode without a cassette tape

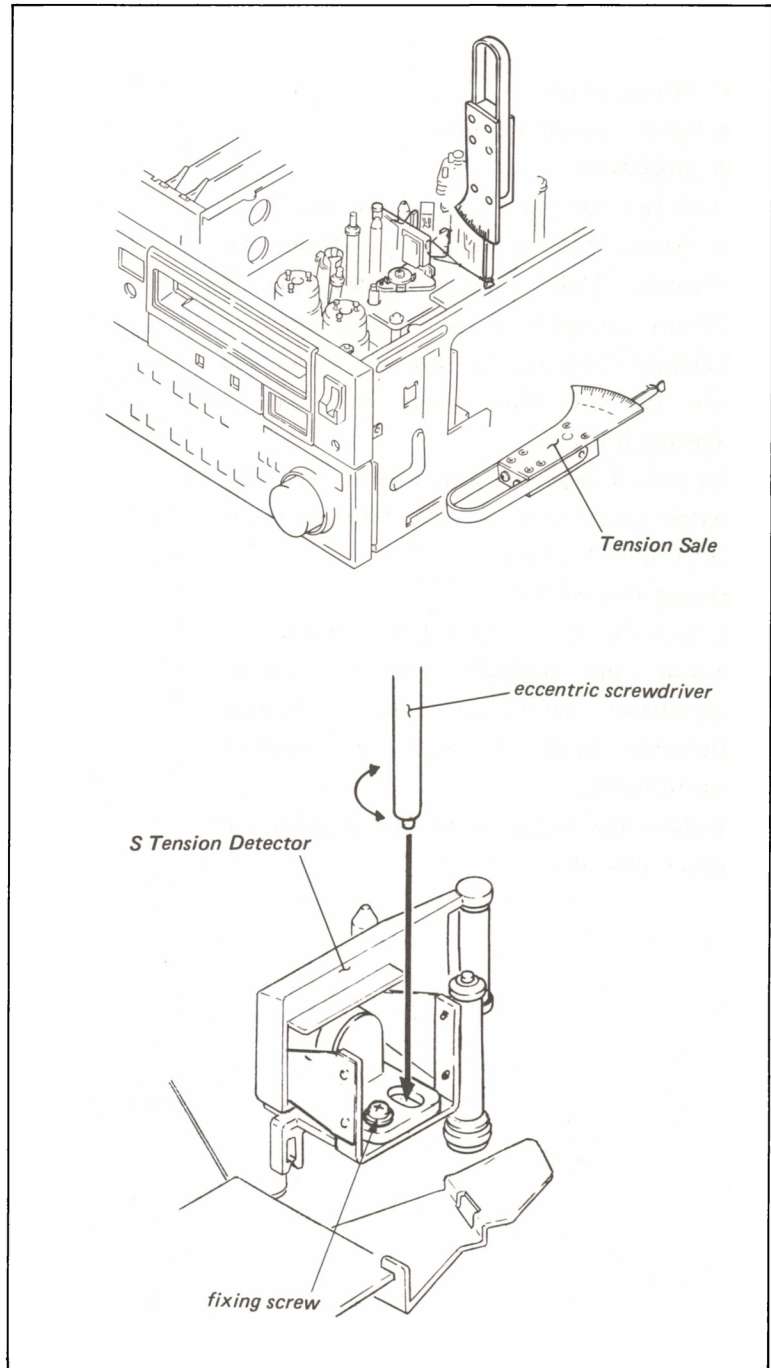
STAND BY OFF mode without a cassette tape

Preparation:

- (1) Short between TP10 and E1 on the SY-102B Board with a shorting clip from the entrance of the Time Code Board. (The clip will disable the Tape Beginning and Tape End Sensors.)
- (2) Extend the SV-88C Board with an extension board.
- (3) Set the Bit 7 of S201 to ON and check that the Bit 8 is set to OFF. Set S202 to ON.
- (4) Connect the oscilloscope to TP602 on the SV-88C Board.

Check procedure:

- (1) Put the unit into the EJECT completion mode without a cassette tape.
- (2) Check that the voltage level at TP602 is $0 \pm 0.5V$. (spec. (1))
- (3) Put the unit into the STANDBY OFF mode without a cassette tape.
- (4) Tie a string to the S Tension Detector Leaf Spring as shown in the figure.
- (5) Hook a tension scale on the end of the string and pull it in the direction of the arrow.
- (6) When the voltage level at TP602 is 4 V, check that the tension scale reads $80.5 \pm 4 V$. (spec.(2))
- (7) If meets the required specification, reset S201 and S202 on the SV-88C Board and remove the shorting clip from the SY-102B Board.



Adjustment procedure:

. For spec. (1)

- (1) Loosen the fixing screw 1/4 to 1/2 turn.
- (2) Insert an eccentric screwdriver and adjust the position of the S Tension Detector to meet the required specification.

. For spec. (2)

- (3) Adjust the RV601 on the SV-88C Board to meet the required specification.
- (4) After adjustment, perform the check procedure.
- (5) Reset S201 and S202 on the SV-88C Board and remove the shorting clip from the SY-102B Board.

6-4. T TENSION DETECTOR ADJUSTMENT

6-4-1. T Tension Detector Guide Height Adjustment

Tool: L-shaped hexagonal wrench
(across flat has 1.5 mm)

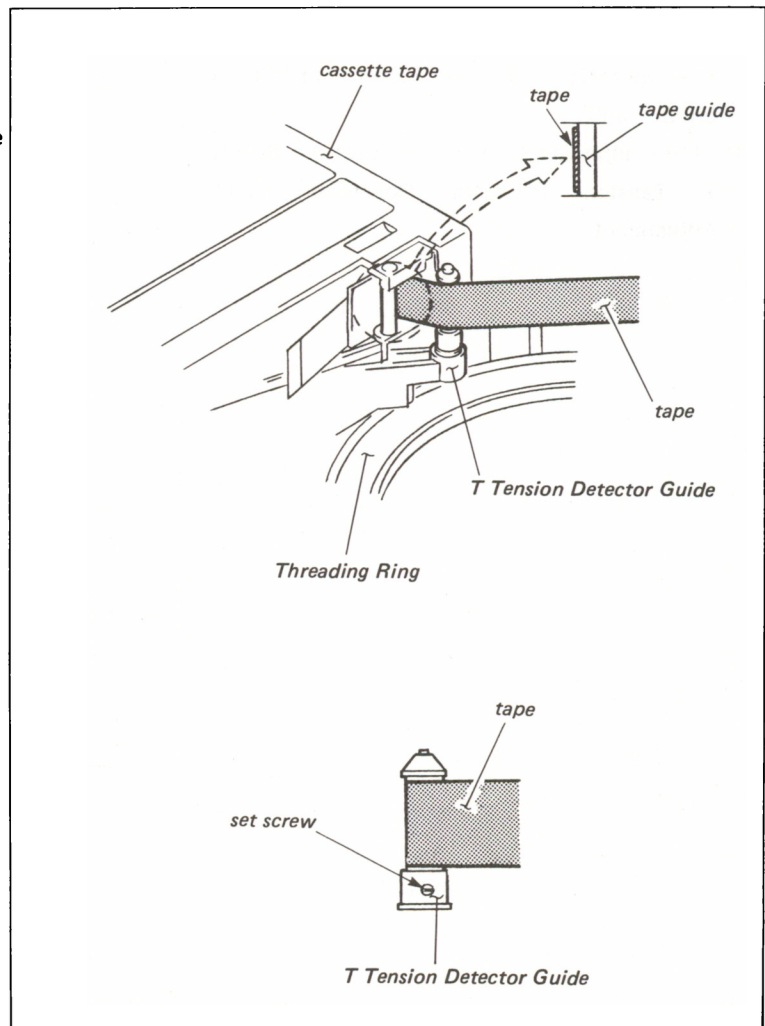
Mode: PLAY / F FWD mode with a cassette tape

Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode.
- (2) Check that the tape runs in the middle of the tape guide in the cassette.
- (3) Check that the tape runs in the middle of the T Tension Detector Guide.
- (4) Put the unit into the F FWD mode.
- (5) Check as described in steps (2) and (3).

Adjustment procedure:

- (1) Loosen the set screw in the lower flange of the T Tension Detector Roller.
- (2) Adjust the height of the T Tension Detector Roller to meet the required specification.



6-4-2. T Tension Detector Guide Operating Position Adjustment

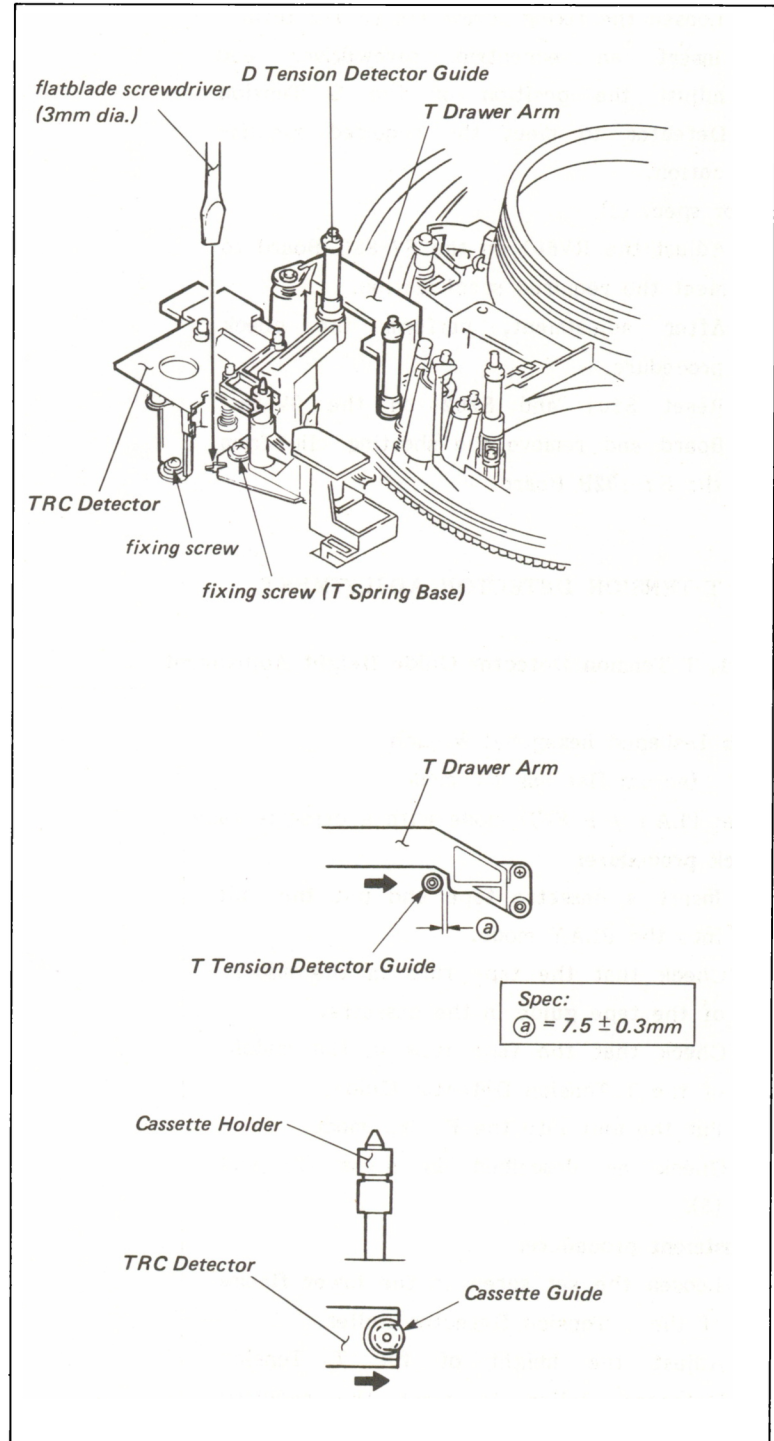
Mode: EJECT completion mode

Check procedure:

- (1) Check that the clearance between the lower flange of the T Tension Detector Guide and the T Drawer Arm to meet the required specification.

Adjustment procedure:

- (1) Remove the TRC Detector Block after removing the fixing screw.
- (2) Loosen the fixing screw of the T Spring Base 1/4 to 1/2 turn.
- (3) While pushing the T Tension Detector Guide in the direction of the arrow, adjust the position of the guide with a flatblade screwdriver (3 mm dia.) to meet the required specification.
- (4) Put the notch of the TRC Detector Block in the groove of the Cassette Holder. While pushing the TRC Detector Block in the direction of the arrow, install it on the unit.
- (5) After adjustment, perform Section 6-4-3, T Tension Detector Operating Point Adjustment.



6-4-3. T Tension Detector Operating Point Adjustment

. It is required that Section 6-4-2, T Tension Detector Guide Operating Position Adjustment is correct before initiating this adjustment.

Tool: Oscilloscope

Special jig tape

This tape should be prepared as follows:

. Cut a piece of video tape, 4 cm long. Form a loop as shown in the figure and secure the end of the loop with a small piece of adhesive tape. Put another piece of adhesive tape on the free end of the jig tape and make a hole through it. Lace a piece of string through the hole and tie a small loop.

Eccentric screwdriver (4 ϕ)

Tension scale (100g full scale)

Extension board (EX-128)

Mode: EJECT completion mode without a cassette tape

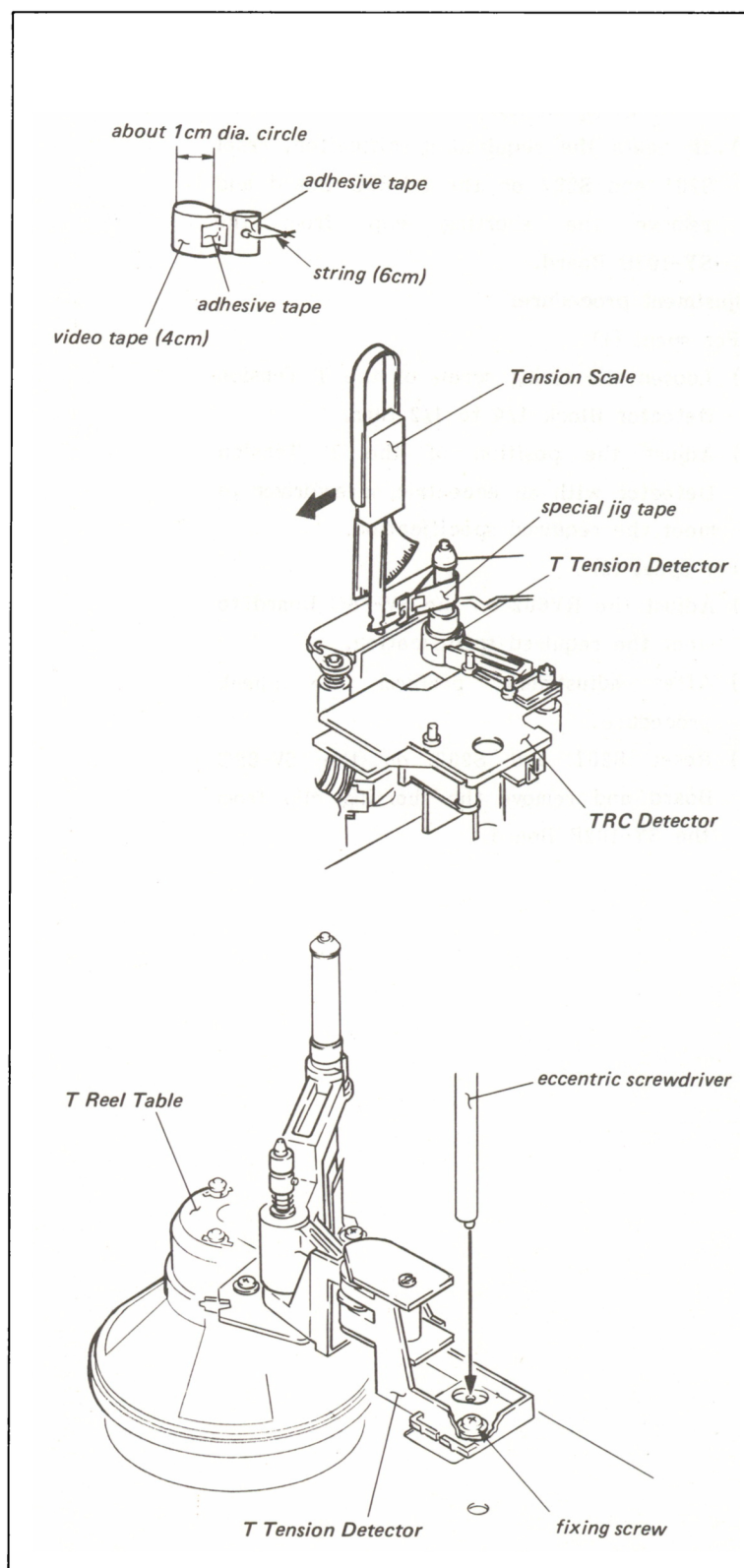
STAND BY OFF mode without a cassette tape

Preparation:

- (1) Short between TP10 and E1 on the SY-102B Board with a shorting clip from the entrance of the Time Code Board. (The clip will disable the Tape Beginning and Tape End Sensors.)
- (2) Extend the SV-88C Board with the extension board.
- (3) Set the Bit 7 of S201 to ON and check that the Bit 8 is set to OFF. Set S202 to ON.
- (4) Connect the oscilloscope to TP604 on the SV-88C Board.

Check procedure:

- (1) Put the unit into the EJECT completion mode without a cassette tape.
- (2) Check that the voltage level at TP604 is $0 \pm 0.5V$. (spec. (1))
- (3) Put the unit into the STANDBY OFF mode without a cassette tape.



- (4) Place the special jig tape on the T Tension Regulator.
- (5) Hook the tension scale to the string from the special jig tape and pull it in the vertical direction of the Arm.
- (6) When the voltage level at TP604 is 4 V, check that the tension scale reads 51 56 g. (spec. (2))
- (7) If meets the required specificalton, reset S201 and S202 on the SV-88C Board and remove the shorting clip from the SY-102B Board.

Adjustment procedure:

. For spec. (1)

- (1) Loosen the fixing screw of the T Tension Detector Block 1/4 to 1/2 turn.
- (2) Adjust the position of the T Tension Detector with an eccentric screwdriver to meet the required specification.

. For spec. (2)

- (3) Adjust the RV602 on the SV-88C Board to meet the required specification.
- (4) After adjustment, perform the check procedure.
- (5) Reset S201 and S202 on the SV-88C Board and remove the shorting clip from the SY-102B Board.

6-5. THREADING SYSTEM ADJUSTMENT

6-5-1. Threading Ring Rotation Adjustment

- . This adjustment is required only when the Threading Ring is replaced or removed.
- . If the Threading Ring is adjusted to a narrower clearance, the ring rotation becomes sluggish. If it is adjusted to a wider clearance, tape run during Threading, PLAY, F FWD, REW and REV modes will be unstable.

Mode: Check mode: EJECT completion/
Threading/Unthreading

Adjustment mode: EJECT completion mode

Check procedure:

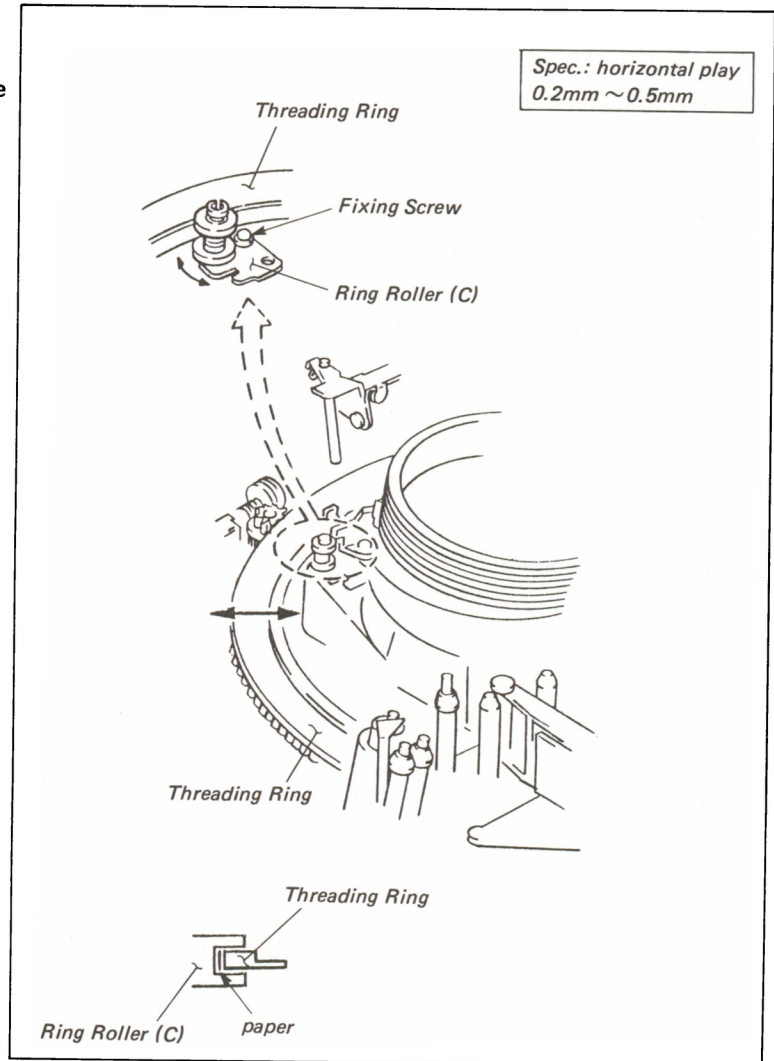
- (1) Put the unit into the EJECT completion mode. Check that horizontal play meets the required specification when the Threading Ring is pushed in the direction of the arrow.
- (2) Check that the rotation of the Threading Ring during the threading and unthreading modes is smooth.

Adjustment procedure:

- (1) Put the unit into the EJECT completion mode.
- (2) Adjust the position of the Ring Roller (C) to meet the required specification.

Reference:

- . Insert a 0.3 mm thick piece of paper between the Threading Ring and the Ring Roller (C) as shown in the figure.
- . Three pages of this service manual are 0.3 mm thick.



6-5-2. Gear Box Installing Position Adjustment

. It is required that Section 6-5-1, Threading Ring Rotation Adjustment is correct before initiating this adjustment.

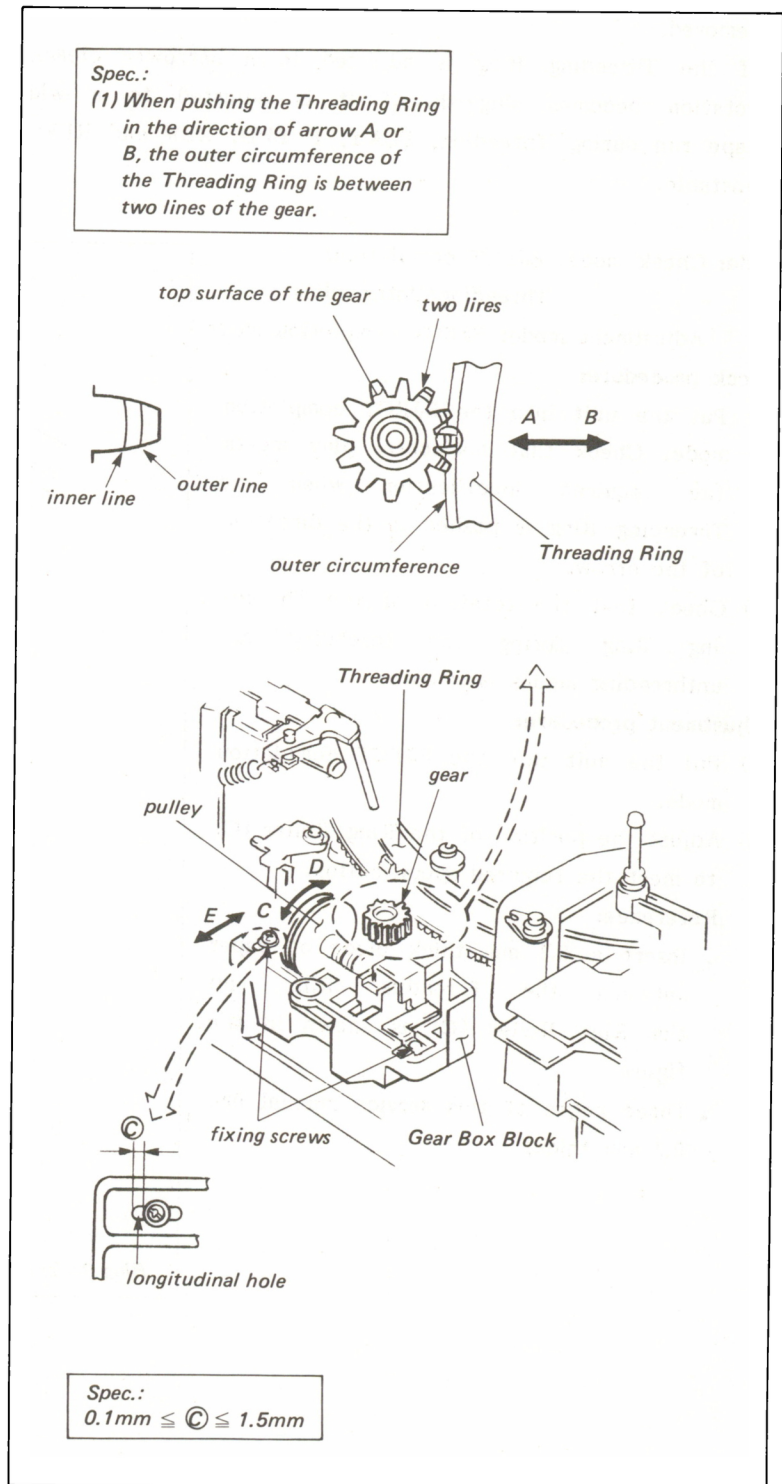
Mode: Put the unit into the EJECT completion mode. Turn the pulley of the Gear Box 1/2 to 1 turn in the direction of arrow C.

Check procedure:

- (1) Put the unit into the EJECT completion mode and then turn the pulley of the Gear Box 1/2 to 1 turn in the direction of arrow C.
- (2) Mark two lines on the top surface of the gear with a black felt tip pen. (Two lines are easy to see during the adjustment.)
- (3) Turn the pulley in the direction of arrow C or D until one of the lines is roughly parallel to the outer circumference of the Threading Ring.
- (4) Check that the relationship between the outer circumference of the Threading Ring and the Gear meets the required specification.

Adjustment procedure:

- (1) Remove the SV-88C Board and the DM-54A Board.
- (2) Turn the pulley in the direction of arrow C or D until one of the lines is roughly parallel to the outer circumference of the Threading Ring.
- (3) Move the Gear Box in the direction of arrow E to meet the required specification.
- (4) Check that Section 6-5-1, Threading Ring Rotation Adjustment meets the required specification.
- (5) Check that C meets the required specification at the longitudinal hole of the gear block as shown in the figure.



6-5-3. Pinch Roller Self Alignment Adjustment

- . If this adjustment is incorrect, the position and the slantness of the Pinch Roller will not be correct when the Pinch Roller is pressed against the Capstan Shaft. Incorrect adjustment will cause a tape to be damaged.
- . After adjustment, perform Section 6-6-2, Pinch Roller Preset Adjustment.

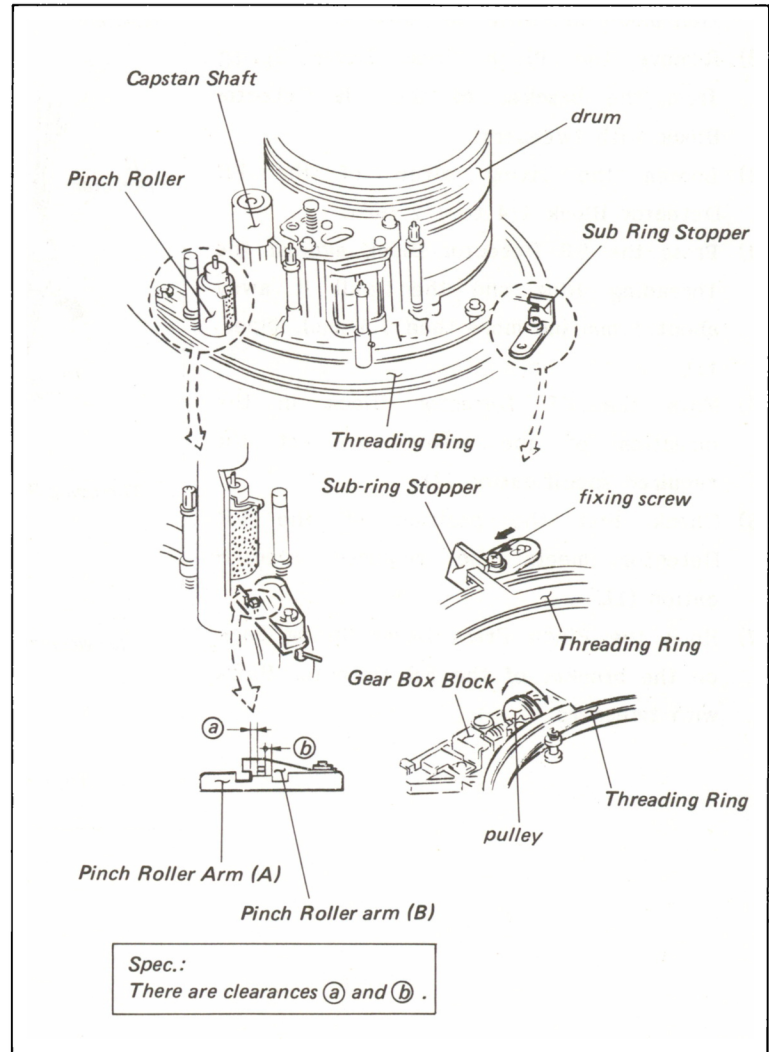
Mode: PLAY mode without a cassette tape

Check procedure:

- (1) Put the unit into the PLAY mode without a cassette tape.
- (2) Check that the relationship of Pinch Roller Arm (A) and Pinch Roller Arm (B) meets the required specification.

Adjustment procedure:

- (1) Put the unit into the PLAY mode without a cassette tape.
- (2) Loosen the fixing screw in the Sub-ring Stopper.
- (3) Turn the pulley of the Gear Box Block in the direction of the arrow to meet the required specification.
- (4) Push the Sub-ring Stopper gently in the direction of the arrow and tighten the fixing screw.
- (5) Put the unit into the EJECT completion mode and then perform the check procedure.



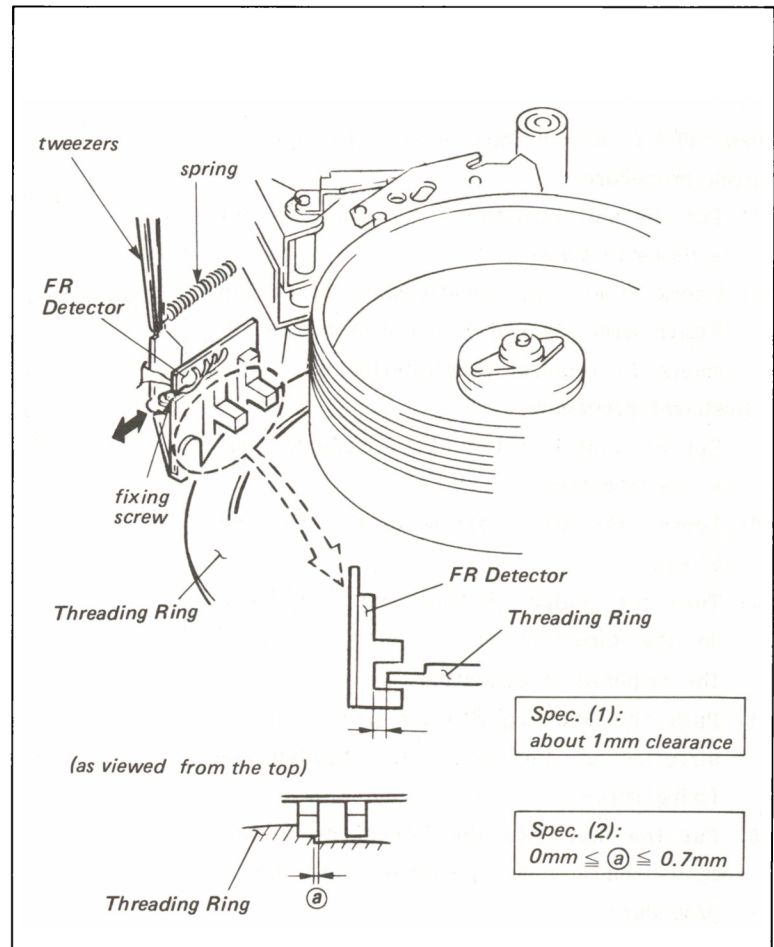
6-5-4. FR Detector Block Installing Position Adjustment

- It is required that Section 6-5-1, Threading Ring Rotation Adjustment is correct before initiating this adjustment.

Mode: Threading completion mode

Adjustment procedure:

- (1) Put the unit into the threading completion mode and turn the power OFF.
- (2) Remove the Pinch Press Lever Spring from the bracket of the FR Detector Block with tweezers.
- (3) Loosen the fixing screw of the FR Detector Block 1/4 to 1/2 turn.
- (4) Press the FR Detector Block against the Threading Ring and then pull it away about 1 mm (no more than 1.5 mm). (Spec. (1))
- (5) Move the FR Detector Block in the direction of the arrow to meet the required specification (2).
- (6) Check that the position of the FR Detector meets the required specification (1).
- (7) Hook the Pinch Press Lever Spring back on the bracket of the FR Detector Block with tweezers.



6-6. PINCH LEVER BLOCK ADJUSTMENT

6-6-1. Pinch Lever Preset Adjustment

. It is required that Section 6-5-1, Threading Ring Rotation Adjustment and Section 6-5-3, Pinch Roller Self Alignment Adjustment are correct before initiating this adjustment.

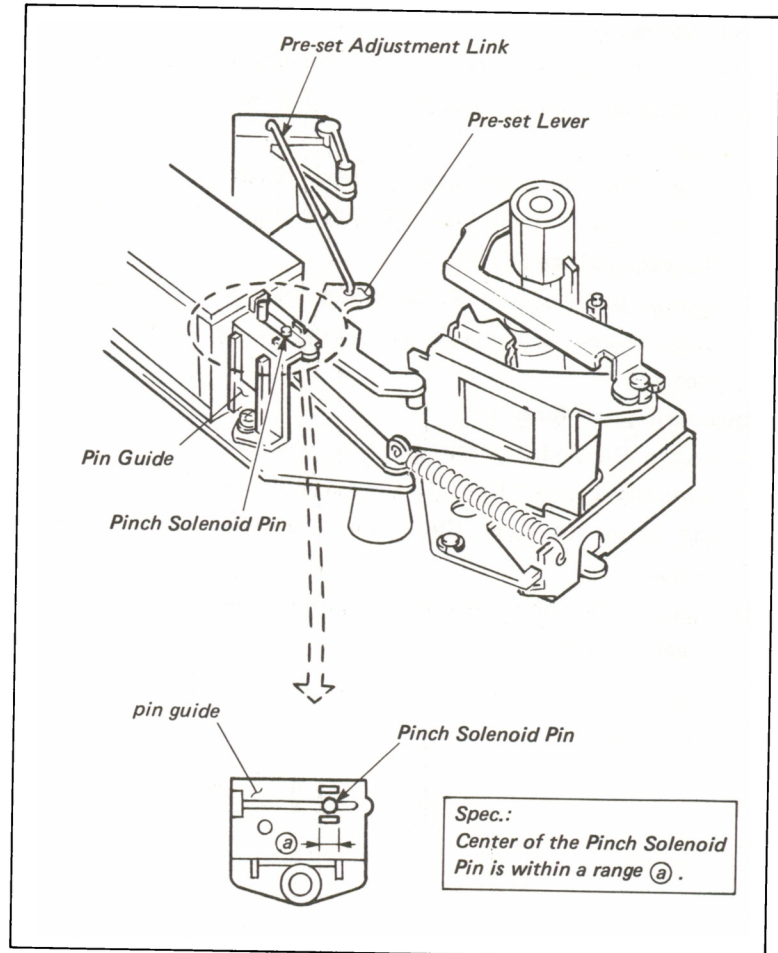
Mode: Turn the power OFF in the PLAY mode

Check procedure:

- (1) Put the unit into the PLAY mode and turn the power OFF. Check that the position of the Pinch Solenoid Pin meets the required specification.
- (2) Turn the power ON and press the PLAY button. After unthreading is complete, check as described in step (1).

Adjustment procedure:

- (1) Adjust the position of the Pinch Solenoid to meet the required specification, referring to Section 6-6-3, Pinch Solenoid Installing Position Adjustment.
- (2) If the specification in Step (1) cannot be obtained, adjust the position of the Sub-ring Stopper to meet the required specification, referring to Section 6-5-3, Pinch Roller Self Alignment Adjustment.
- (3) If the specification in Steps (1) and (2) cannot be obtained, insert the Pinch Lever Preset Adjustment Link into the appropriate hole of the Preset Lever Ass'y to meet the required specification. Perform Steps (1) and (2) again.



6-6-2. Pinch Roller Preset Adjustment

. It is required that Section 6-5-1, Threading Ring Rotation Adjustment and Section 6-5-3, Pinch Roller Self Alignment Adjustment are correct before initiating this adjustment.

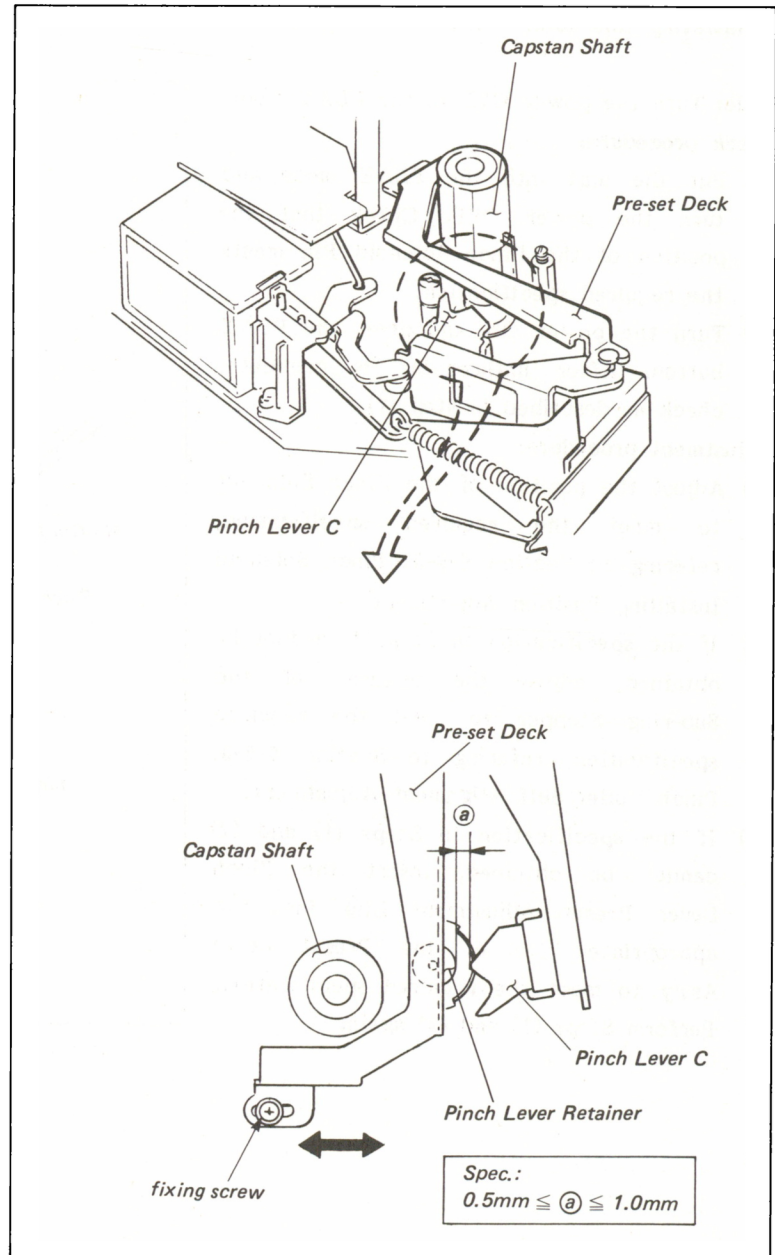
mode: Threading completion mode without a cassette tape

Check procedure:

- (1) Put the unit into the Threading completion mode without a cassette tape.
- (2) Check that the clearance between Pinch Lever C and Pinch Lever Retainer meets the required specification.
- (3) Repeat the PLAY / STOP modes two or three times and check as described in step (2).

Adjustment procedure:

- (1) Loosen the fixing screw $1/4$ to $1/2$ turn.
- (2) Move the Pre-set Deck in the direction of the arrow to meet the required specification.
- (3) Tighten the fixing screw and perform the check procedures.



6-6-3. Pinch Solenoid Installing Position Adjustment

. This adjustment is required only when the Pinch Solenoid is replaced or removed.

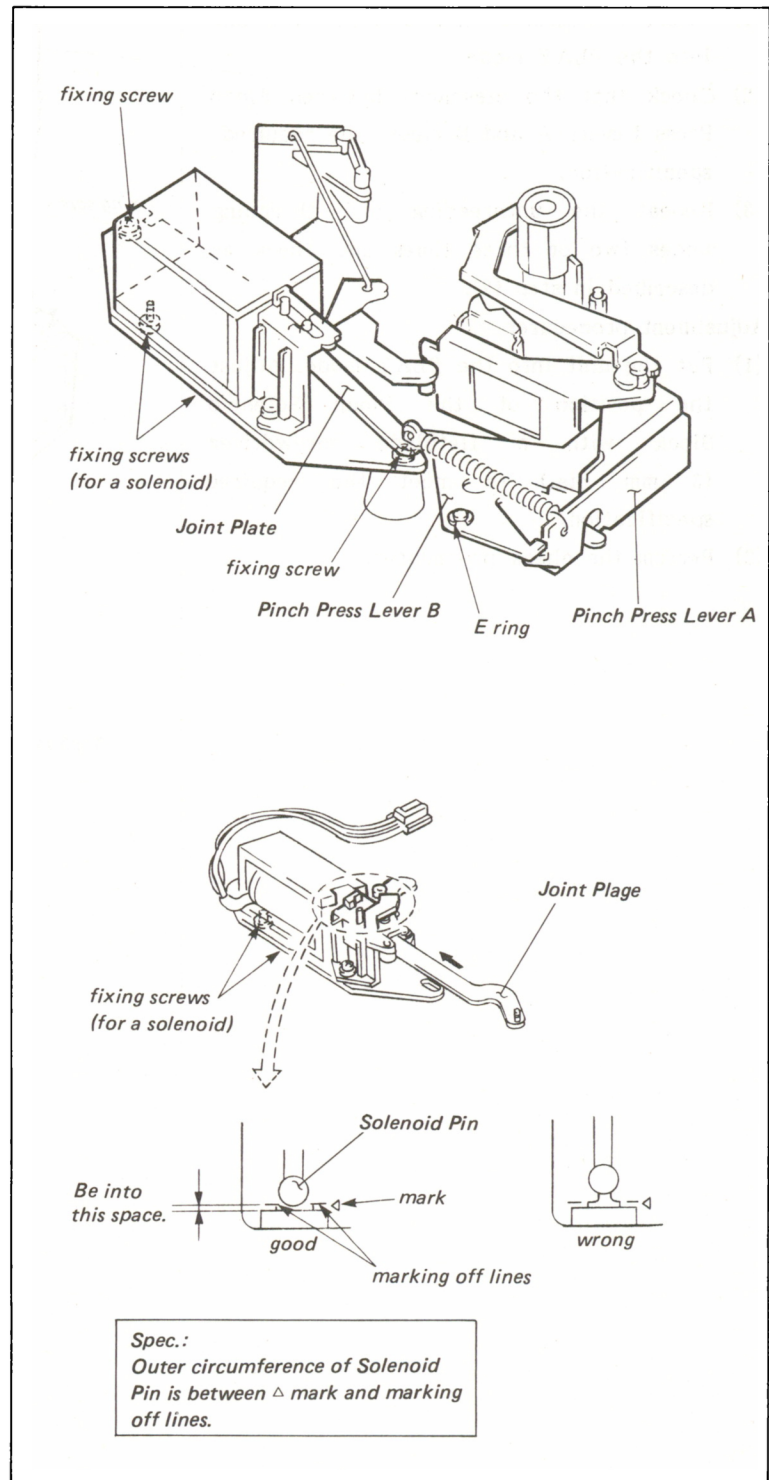
Mode: PLAY mode with a cassette tape

Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode.
- (2) Check that the outer circumference of the Solenoid Pin meets the required specification.

Adjustment procedure:

- (1) Remove the E ring and the Joint Lever from the Pinch Press Lever B.
- (2) Remove the Pinch Solenoid Block from the chassis after removing the two fixing screws.
- (3) Move the Joint Lever to the fully energized position (as far as it will go in the direction of the arrow). Adjust the position of the solenoid so that the outer circumference of the Solenoid Pin to meet the required specification.
- (4) Install the Pinch Solenoid Block on the unit. Perform the check procedure.



6-6-4. Pinch Solenoid Block Position Adjustment

Tool: Thickness gauge

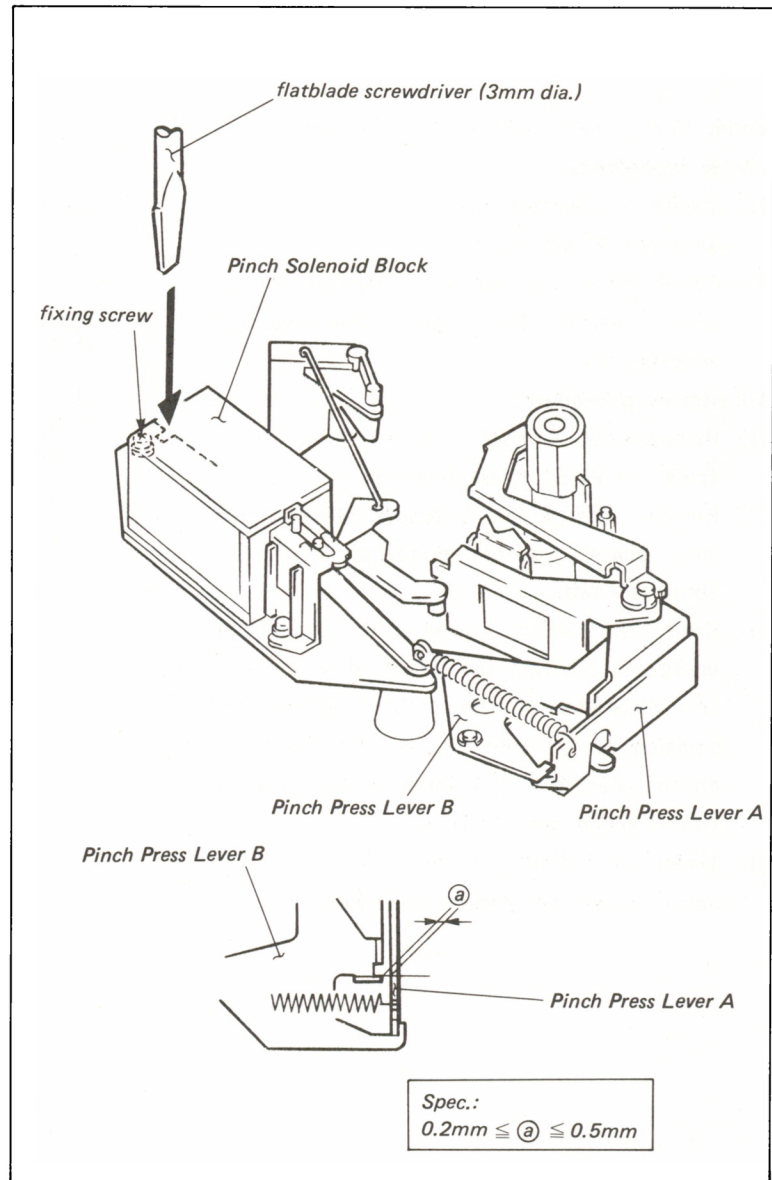
Mode: PLAY mode with a cassette tape

Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode.
- (2) Check that the clearance between Pinch Press Levers A and B meets the required specification.
- (3) Repeat the unthreading and threading modes two or three times and check as described in step (2).

Adjustment procedure:

- (1) Put the unit into the PLAY mode. Adjust the position of the Pinch Solenoid Block with a flatblade screwdriver (3 mm dia.) to meet the required specification.
- (2) Perform the check procedures.



6-7. T TAPE SENSOR POSITION ADJUSTMENT

. There are two adjustments in this section. The first is the height adjustment and the second is the adjustment of the clearance between the tape and LED.

Tool: Thickness gauge

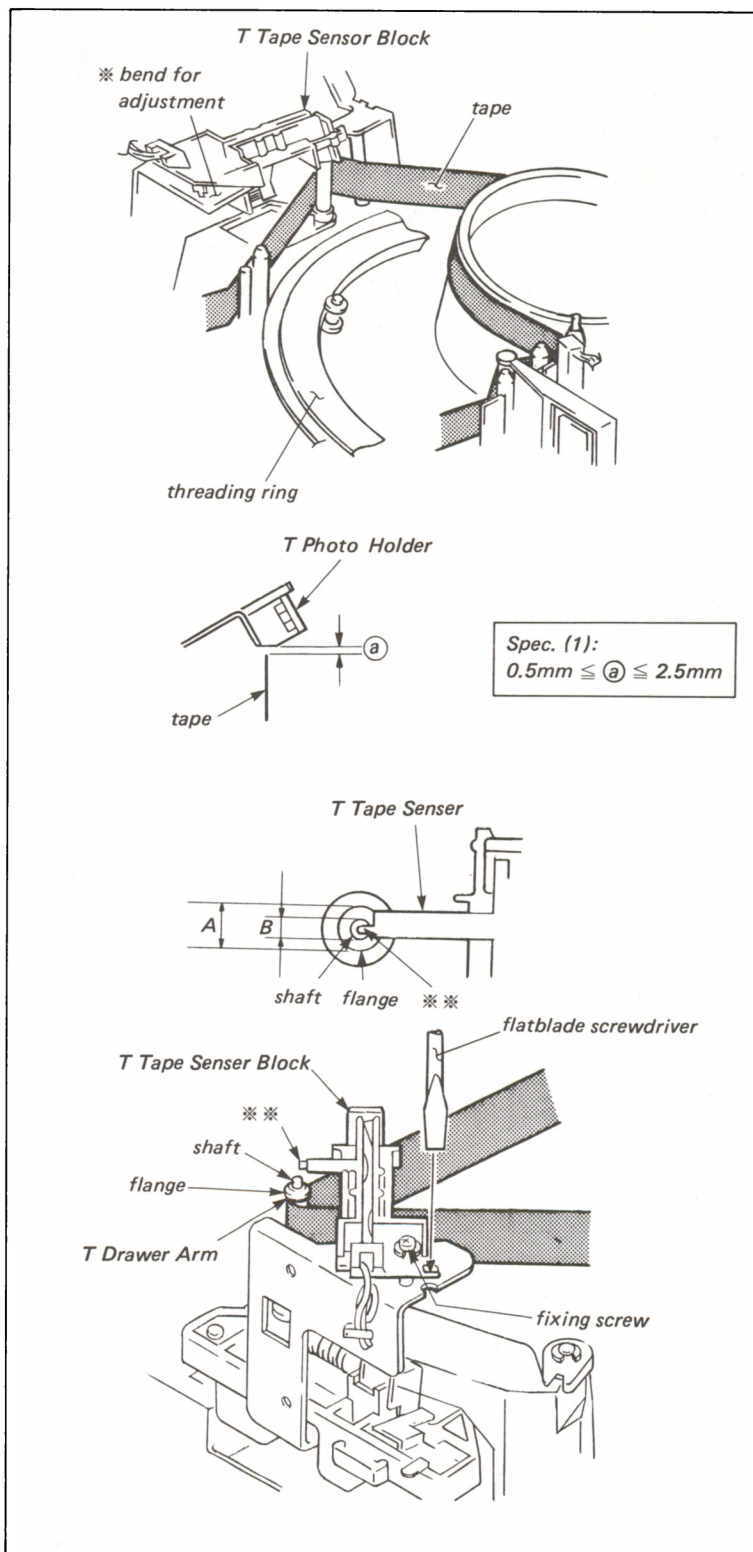
Mode: PLAY mode with a cassette tape

Check procedure:

- (1) Turn the power ON. Put the unit into the PLAY mode and then put the unit into the EJECT mode. When the T Drawer Arm begins to move during unthreading, turn the power OFF. At this time, check that the clearance between the top edge of a tape and the bottom side of the T Photo Holder Block (black plastic) meets the required specification. (Spec. (1))
- (2) Put the unit into the PLAY mode.
- (3) As viewed from the top of the unit, check that the ** of the T Tape Sensor Block is above the upper flange of the T Drawer Arm (within the range "A"). (Spec. (2))

Adjustment procedure:

- (1) Bend the * with a pliers to meet the required specification (1). Perform check procedures (2) and (3).
- (2) Loosen the fixing screw of the T Tape Sensor Block 1/2 to 1 turn.
- (3) As viewed from the top of the unit in the PLAY mode, adjust the position of the T Tape Sensor Block with a flatblade screwdriver so that the ** of the T Tape Sensor Block is above the shaft of the T Drawer Arm (within the range "B").
- (4) Check that it meets the required specification (1).



6-8. S DRAWER ROLLER BLOCK LIMITER ADJUSTMENT

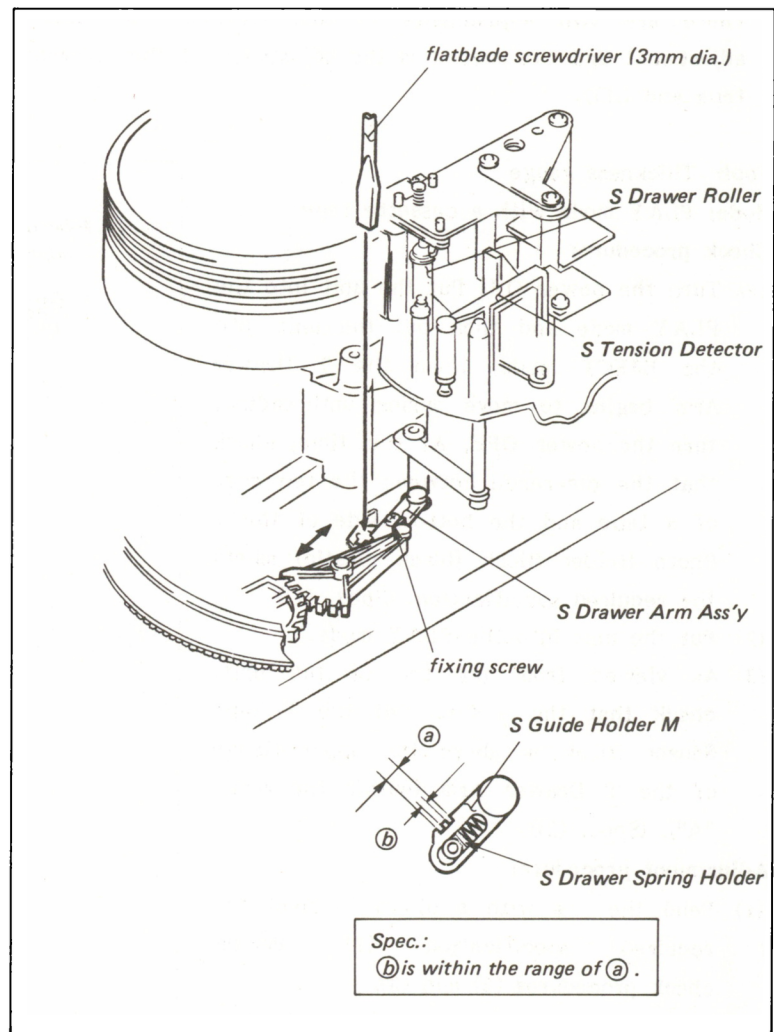
Mode: Threading completion mode without a cassette tape

Check procedure:

- (1) Check that " b " of the S Drawer Spring Holder in the S Drawer Roller Block fits into notch " a " of the S Guide Holder M.

Adjustment procedure:

- (1) Loosen the fixing screw of the S Drawer Arm Ass'y 1/4 to 1/2 turn.
- (2) Adjust the position of the S Drawer Arm Ass'y with a flatblade screwdriver (3 mm dia.) to meet the required specification.



6-9. BRAKE SOLENOID POSITION ADJUSTMENT

6-9-1. T Brake Solenoid Position Adjustment

Tool: Eccentric screwdriver (6 ϕ)

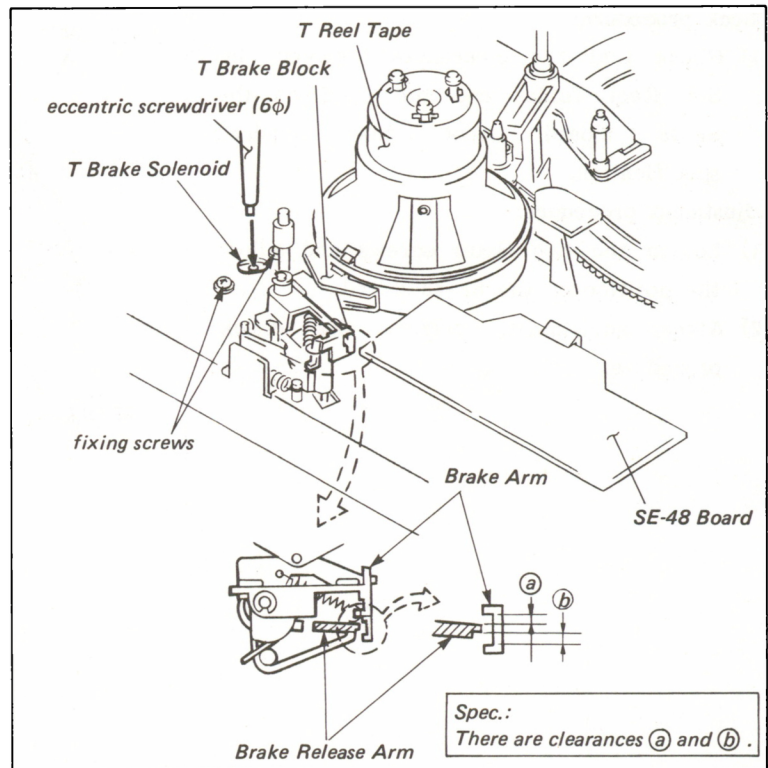
Mode: PLAY mode without a cassette tape

Check procedure:

- (1) Check that the relationship between the Brake Release Arm and the Brake Arm meets the required specification.

Adjustment procedure:

- (1) Adjust the position of the T Brake Solenoid with an eccentric screwdriver to meet the required specification.



6-9-2. S Brake Solenoid Position Adjustment

Tool: Eccentric screwdriver (6 ϕ)

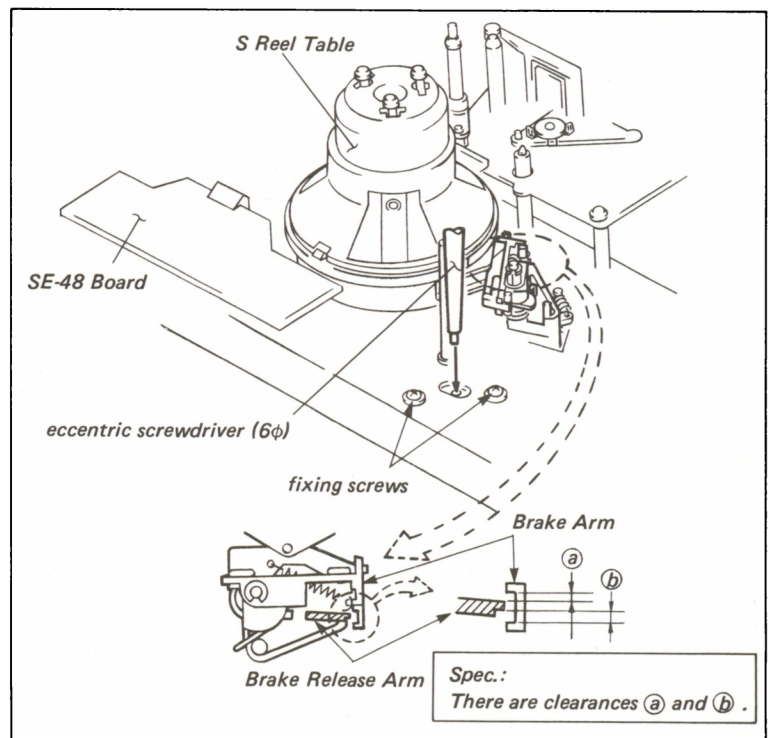
Mode: PLAY mode without a cassette tape

Check procedure:

- (1) Check that the relationship between the Brake Release Arm and the Brake Arm meets the required specification.

Adjustment procedure:

- (1) Adjust the position of the S Brake Solenoid with an eccentric screwdriver to meet the required specification.



6-10. REEL TABLE ROTATION DETECTOR BLOCK POSITION ADJUSTMENT

Tool: Thickness gauge

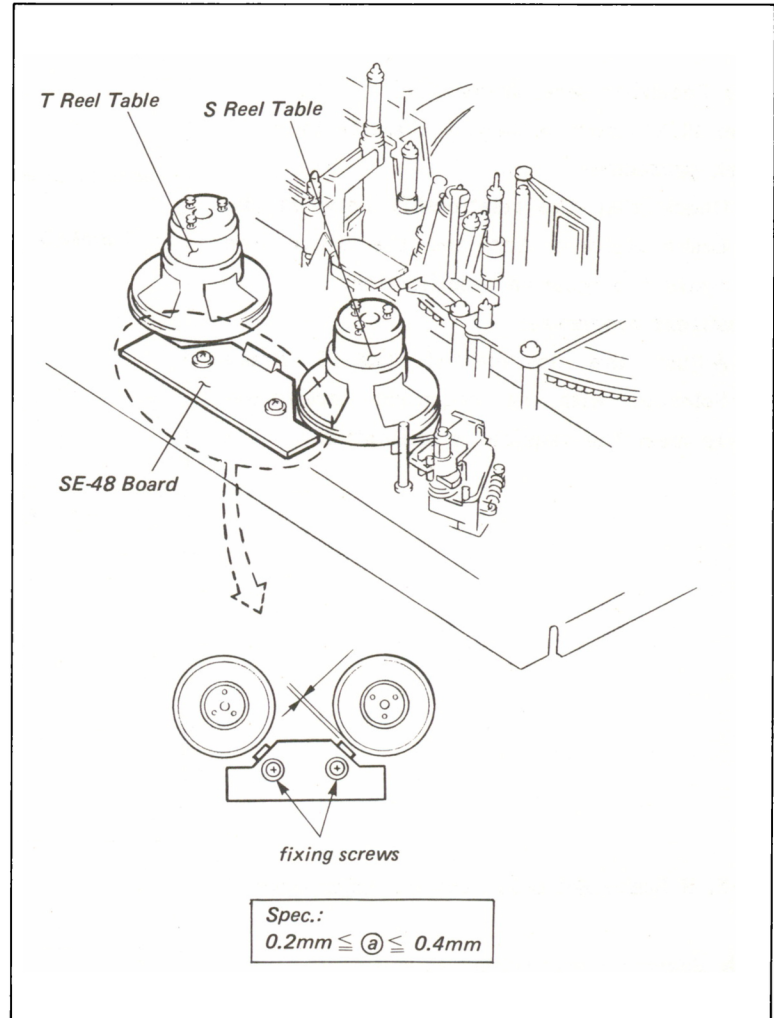
Mode: EJECT completion mode

Check procedure:

- (1) Check that the clearances between the S/T Reel Tables and the DME on the SE-48 Board meet the required specification.

Adjustment procedure:

- (1) Loosen the two fixing screws and adjust the position of the SE-48 Board.
- (2) After adjustment, perform the check procedure.



6-11. CASSETTE-UP COMPARTMENT ADJUSTMENT

- . The Cassette-up Compartment has two photo-electric switches. The ON/OFF timing of these switches is adjusted in this procedures.
- . Remove the Cassette-up Compartment from the unit for this adjustment.

6-11-1. Cassette-in Switch Position Adjustment

Tool: KCA type cassette tape

Circuit tester

Thickness gauge

Preparation:

- (1) Connect jumpers from the harness plug for the Cassette-up Compartment to terminals on the CC-31 Board as follows:

plug of harness (CN1)	terminal on CC-31 Board
pin 4 (5V) ←	→ pin 4/CN401
pin 5 or 2 (GND) ←	→ pin 5 or 2/CN401

- (2) Turn the power ON.

Check procedure:

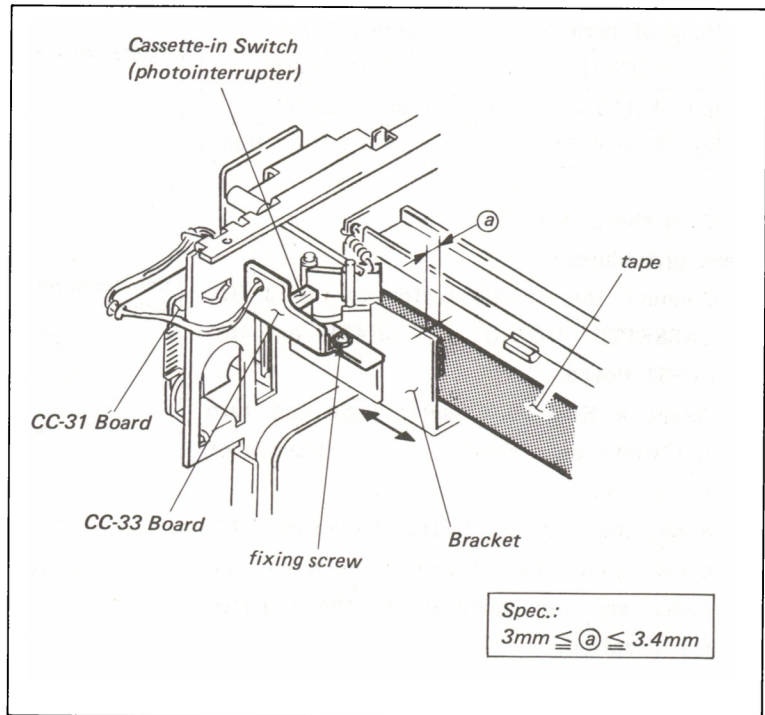
- (1) Connect the circuit tester to pin 1 (H; CASSETTE IN) of CN401 on the CC-31 Board.
- (2) Slowly insert a KCA-60 cassette tape.
- (3) When the circuit tester indicates "H" (about 5V), check that the clearance between the front side of the cassette tape and the bracket of the Cassette-up Compartment meets the required specification.

Adjustment procedure:

- (1) Move the Cassette-in Switch in the direction of the arrow to meet the required specification.

Reference:

Insert a 3.3 mm thickness gauge between the cassette tape and the bracket. Adjust the position of the Cassette-in Switch until the circuit tester indicates to "H".



6-11-2. Cassette-down Switch Position Adjustment

Tool: Circuit tester

Preparation:

- (1) Connect jumpers from the harness plug of the Cassette-up Compartment to terminal on the CC-31 Board as follows:

plug of harness (CN1)	terminal on CC-31 Board
pin 4 (5V) ←	→ pin 4/CN401
pin 5 or 2 (GND) ←	→ pin 5 of 2/CN401

- (2) Turn the power ON.

Check procedure:

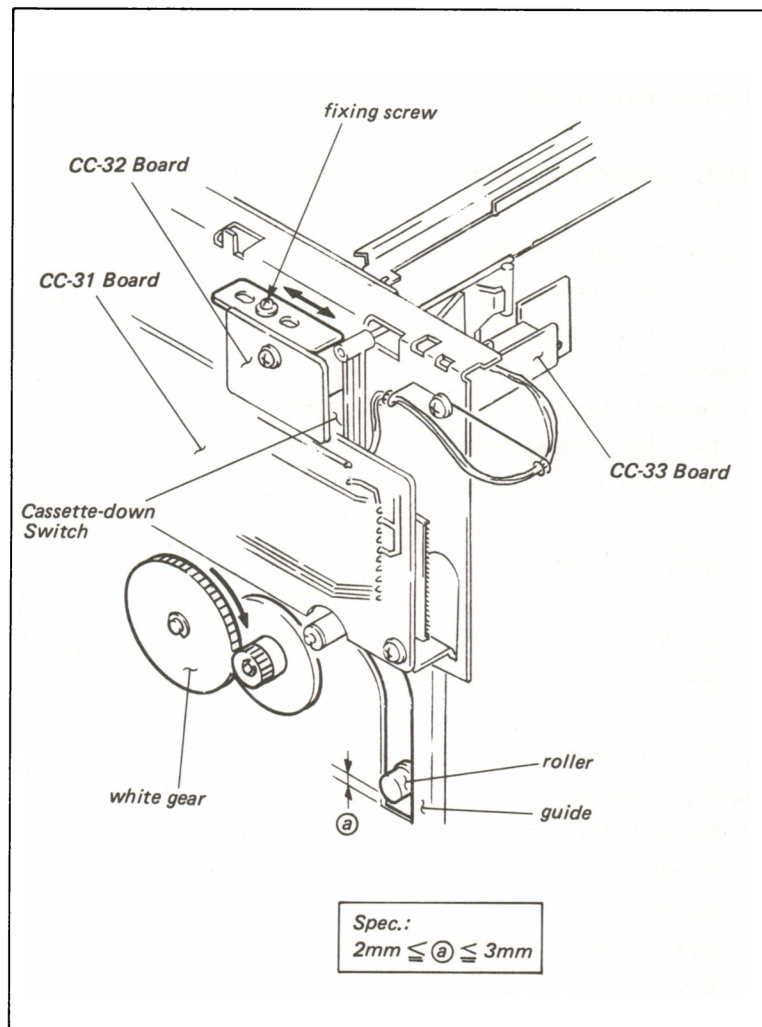
- (1) Connect the circuit tester to pin 3 (H; CASSETTE DOWN) of CN401 on the CC-31 Board.
- (2) Insert a KCA-60 cassette tape and turn the white gear slowly in the direction of the arrow.
- (3) When the circuit tester indicates "H", check that the clearance between the roller and the guide meets the required specification.

Adjustment procedure:

- (1) Move the Cassette-down switch in the direction of the arrow to meet the required specification.

Reference:

Turn the white gear on the right side until the clearance between the roller and the guide is 2.2 mm. Adjust the position of the Cassette-down Switch so that the circuit tester indicates "H" in this position.



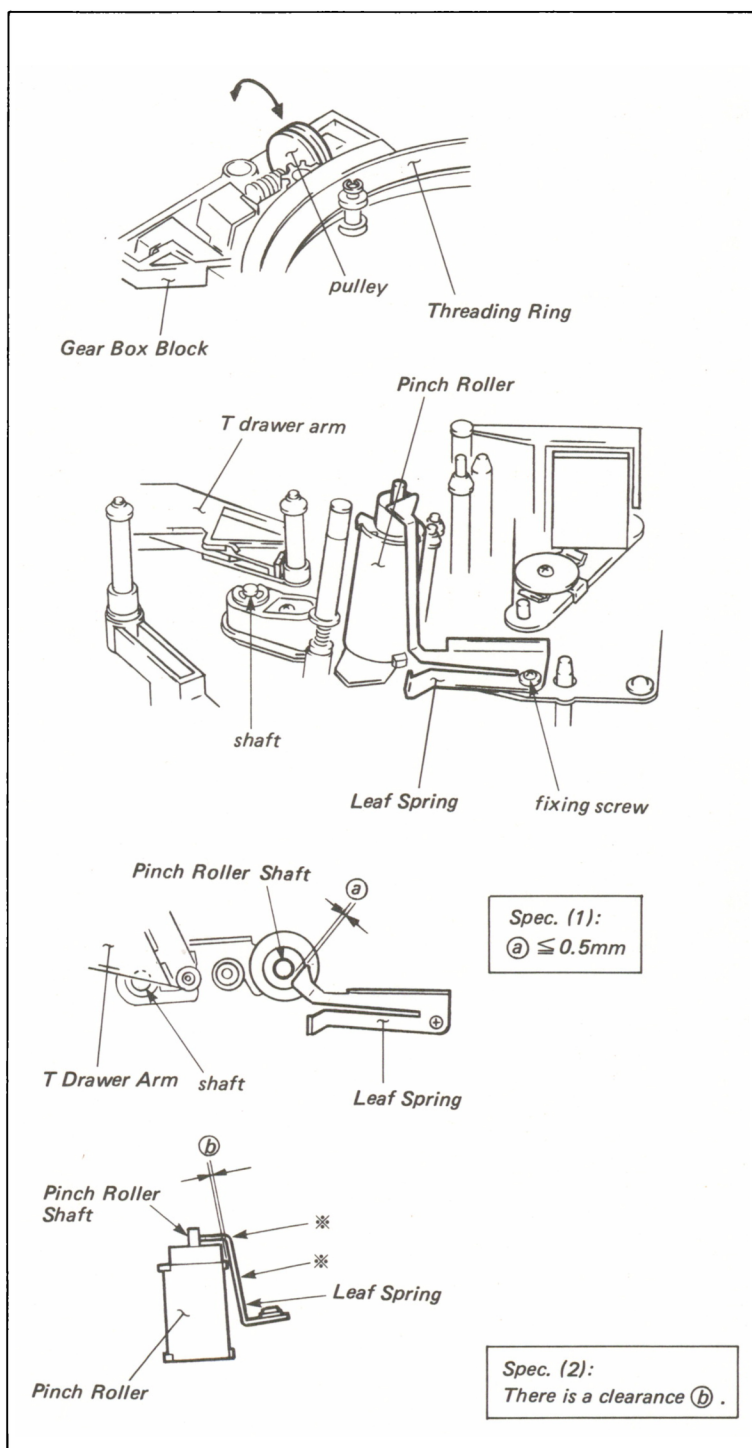
6-12. LEAF SPRING POSITION ADJUSTMENT

Check procedure:

- (1) Put the unit into the PLAY mode without a cassette tape, and then put the unit into the EJECT mode.
- (2) Turn the Pulley of the Gear Box by hand until the edge of the T Drawer Arm is at the center of the shaft as shown in the figure.
- (3) Check that the clearance between the Leaf Spring and the Pinch Roller Shaft meets the required specification (1).
- (4) Put the unit into the PLAY mode without a cassette tape, and then put the unit into the EJECT completion mode.
- (5) Check that the Leaf Spring touches the Pinch Roller Shaft, and that the clearance between the Leaf Spring and the Pinch Roller meets the required specification (2).

Adjustment procedure:

- (1) Adjust the position of the Leaf Spring to meet the required specifications (1) and (2). If specification (2) cannot be obtained, bend the of the Leaf Spring to meet the required specification.



SECTION 7 TORQUE SYSTEM ALIGNMENT

7-1. S BRAKE TORQUE ADJUSTMENT

Tool: Reel table torque measurement tape
(100 mm dia.)

Tension scale (200 g full scale)

Mode: EJECT completion / power OFF mode

Check procedure:

- (1) Remove the spring and release the Sub Brake.
- (2) Grasp the top of the S Reel Table. While turning it in the clockwise direction approx. 30 degrees, check that the clearance between the Brake Arm and the Lining Holder meets the required specification (1) as shown in the figure.
- (3) Place the jig tape on the S Reel Table and hook a tension scale to the end of the jig tape. Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification (2).
- (4) If meets the required specification, hook the spring of the Sub Brake.

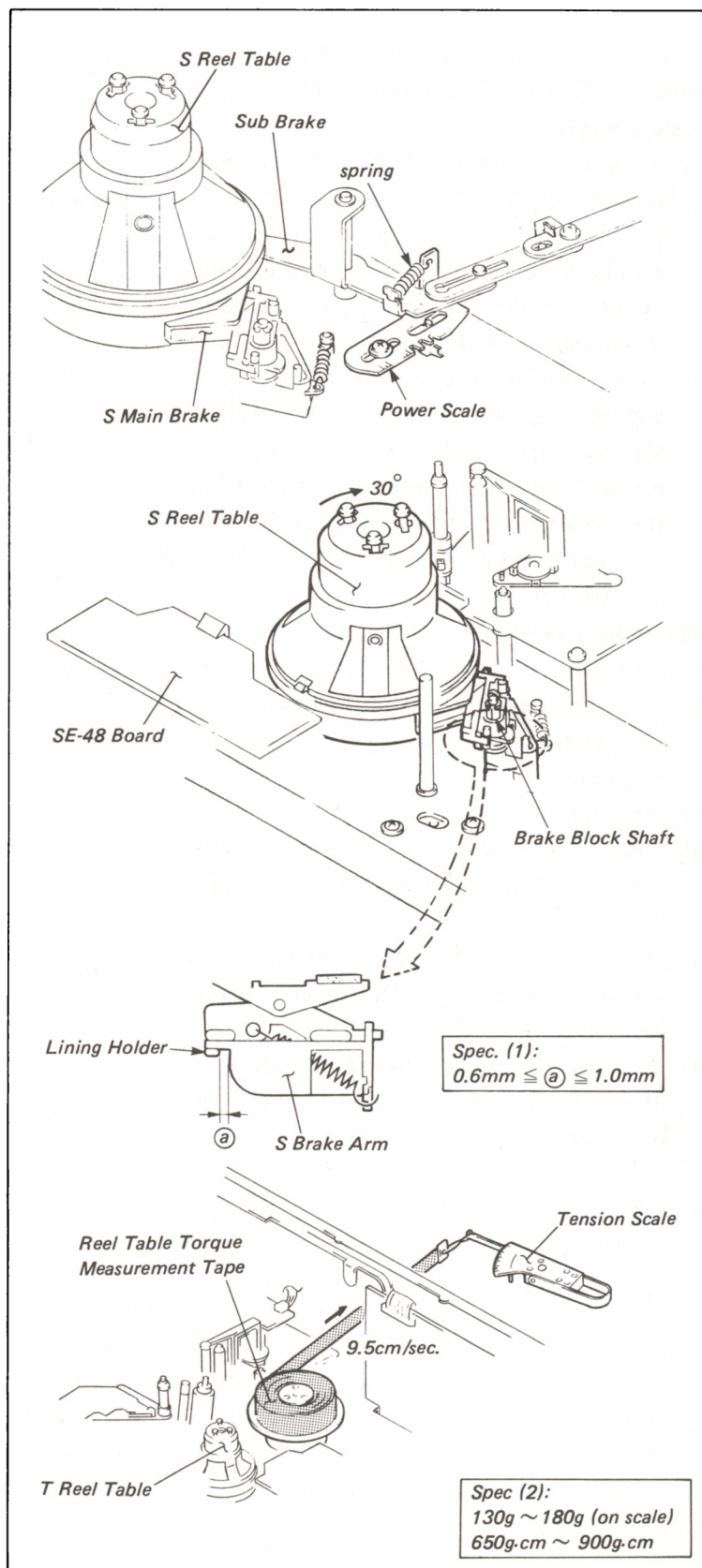
Adjustment procedure:

For Spec. (1)

- (1) Bend the Brake Block Shaft toward the reel table (or in the opposite direction) by hand.

For Spec. (2)

- (2) Clean the surface of the reel table with a cloth moistened with cleaning fluid.
- (3) If does not meet the specification (2), replace the Lining Holder and check again.
- (4) If does not meet the specification in Step (3), replace the reel table and check again.
- (5) After adjustment, hook the spring of the Sub Brake.



7-2. T BRAKE TORQUE ADJUSTMENT

Tool: Reel table torque measurement tape
(100 mm dia.)

Tension scale (200 g full scale)

Mode: EJECT completion / power OFF mode

Check procedure:

- (1) Grasp the top of the T Reel Table. While turning it in the clockwise direction approx. 30 degrees, check that the clearance between the Brake Arm and the Lining Holder meets the required specification (1) as shown in the figure.
- (2) Install the jig tape on the T Reel Table and hook a tension scale to the end of the jig tape. Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification (2).

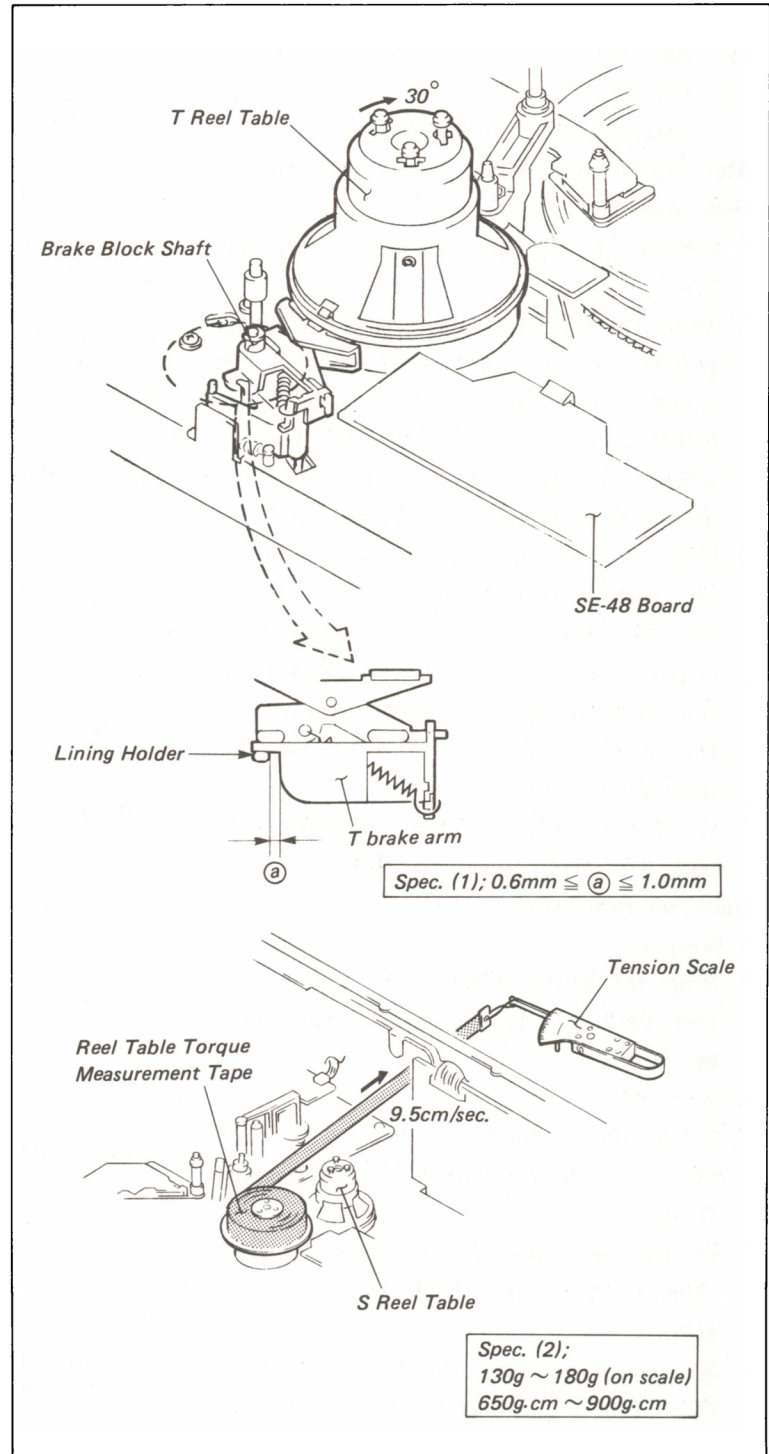
Adjustment procedure:

For Spec. (1)

- (1) Bend the Brake Block Shaft toward the reel table (or in the opposite direction) by hand.

For Spec. (2)

- (2) Clean the surface of the reel table with a cloth moistened with cleaning fluid.
- (3) If does not meet the specification (2), replace the Lining Holder and check again.
- (4) If does not meet the specification in Step (3), replace the reel table and check again.



7-3. SUB BRAKE ADJUSTMENT

7-3-1. Sub Brake Torque Adjustment

Tool: Reel table torque measurement tape
(100 mm dia.)

Tension scale (200 g full scale)

Mode: EJECT completion / POWER OFF

Check procedure:

- (1) Remove the spring of the S Main Brake from the shaft.
- (2) Install the jig tape on the S Reel Table and hook a tension scale to the end of the jig tape. Pull out the tape at a constant speed of approx. 9.5cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.
- (3) When the scale reading is within the specification, hook the spring to the shaft as it was before.

Adjustment procedure:

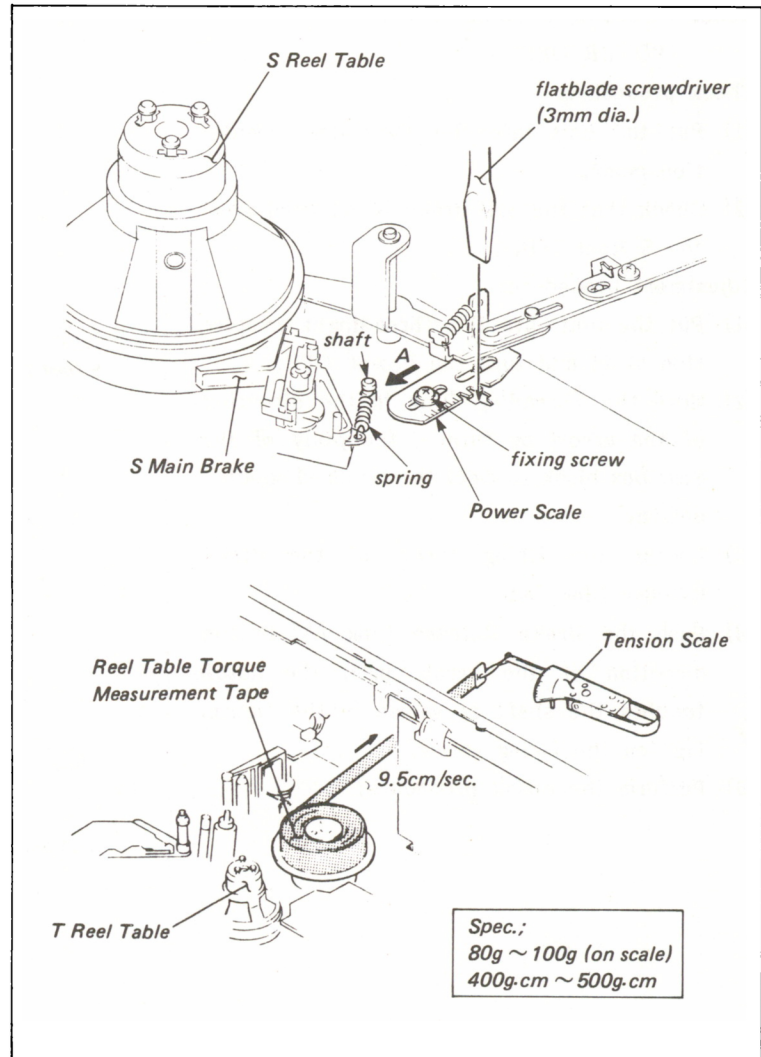
- (1) Clean the surface of the reel table with a cloth moistened with cleaning fluid.
- (2) Loosen the fixing screw of the Power Scale 1/4 to 1/2 turn.
- (3) Inset a flatblade screwdriver in the adjustment hole and adjust the position of the Power Scale.

. If the scale reading is more than the specification, move the Power Scale in the direction of arrow A.

Reference:

One scale (1 mm) of the Power Scale changes the tension reading about 20 g (100g - cm).

- (4) After adjustment, hook the spring to the shaft as it was before.



7-3-2. Sub Brake Release Adjustment

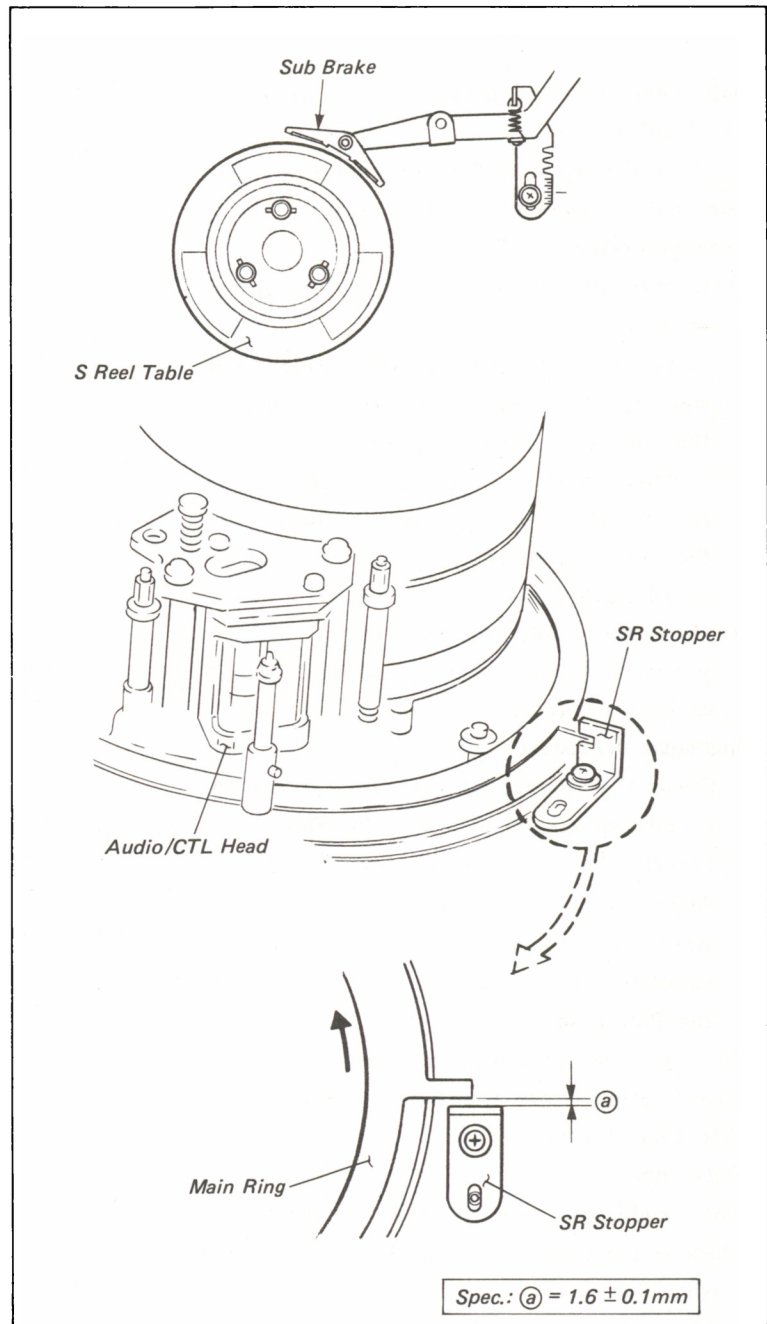
Mode: Threading completion mode
(POWER OFF)

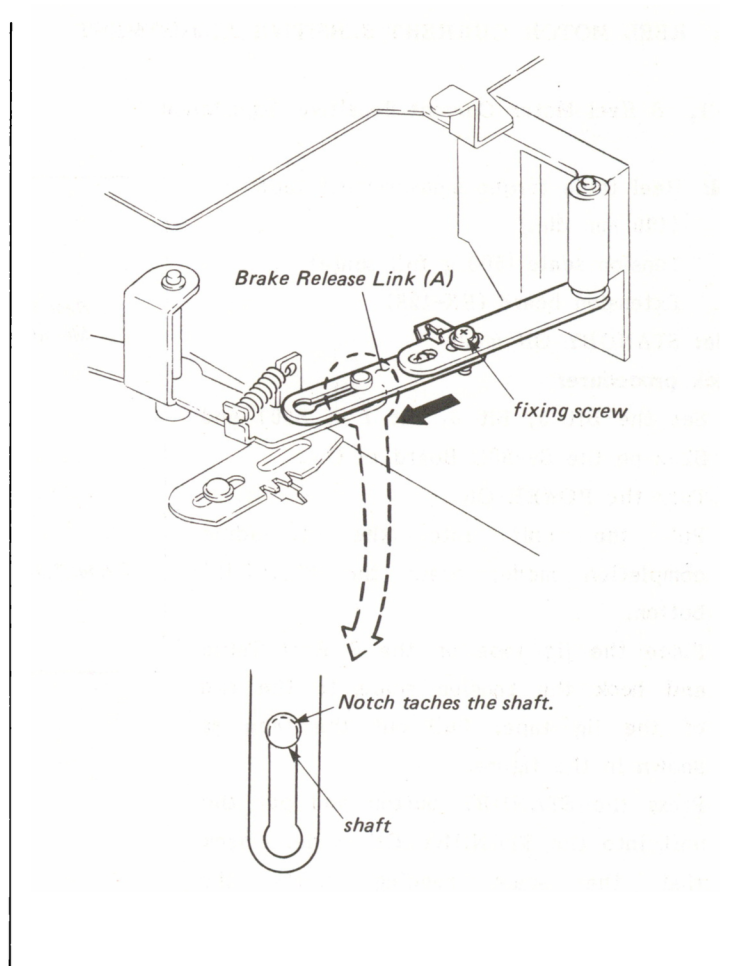
Check procedure:

- (1) Put the unit into the Threading completion mode.
- (2) Check that the Sub Brake is released from the S Reel Table.

Adjustment procedure:

- (1) Put the unit into the Threading completion mode and turn the Power OFF.
- (2) Move the Threading Ring in the direction of the arrow by turning the pulley of the gear box block to meet the required specification.
- (3) Loosen the fixing screw of the Brake Release Link (A).
- (4) Push the Brake Release Link (A) in the direction of the arrow until the notch touches the shaft as shown in the figure. Tighten the fixing screw.
- (5) Perform the check procedure.





7-4. REEL MOTOR CURRENT SENSITIVE ADJUSTMENT

7-4-1. S Reel Motor Current Sensitive Adjustment

Tool: Reel table torque measurement tape
(100 mm dia.)
Tension scale (500 g full scale)
Extension board (EX-128)

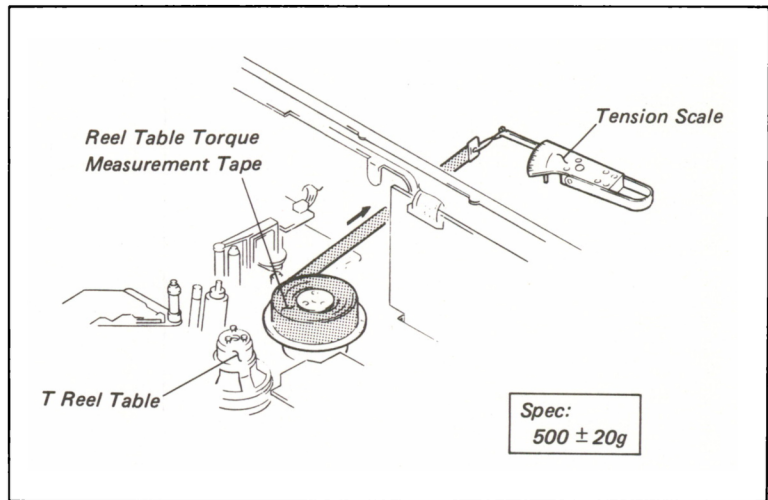
Mode: STANDBY ON mode

Check procedure:

- (1) Set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to ON.
- (2) Turn the POWER ON.
- (3) Put the unit into the Threading completion mode, press the STANDBY button.
- (4) Place the jig tape on the S Reel Table and hook the tension scale to the end of the jig tape. Pull out the tape as shown in the figure.
- (5) Press the STANDBY button and put the unit into the STANDBY ON mode. Check that the scale reading meets the required specification.
- (6) If it meets the required specification, press the STANDBY button and then remove the jig tape. Put the unit into the Threading completion mode, set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to OFF.

Adjustment procedure:

- (1) Adjust the RV2 of the DR-53 Board to meet the required specification.
- (2) After adjustment, press the STANDBY button and remove the jig tape. Put the unit into the Threading completion mode, set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to OFF.



7-4-2. T Reel Motor Current Sensitive Adjustment

Tool: Reel table torque measurement tape
(100 mm dia.)
Tension scale (500 g full scale)
Extension board (EX-128)

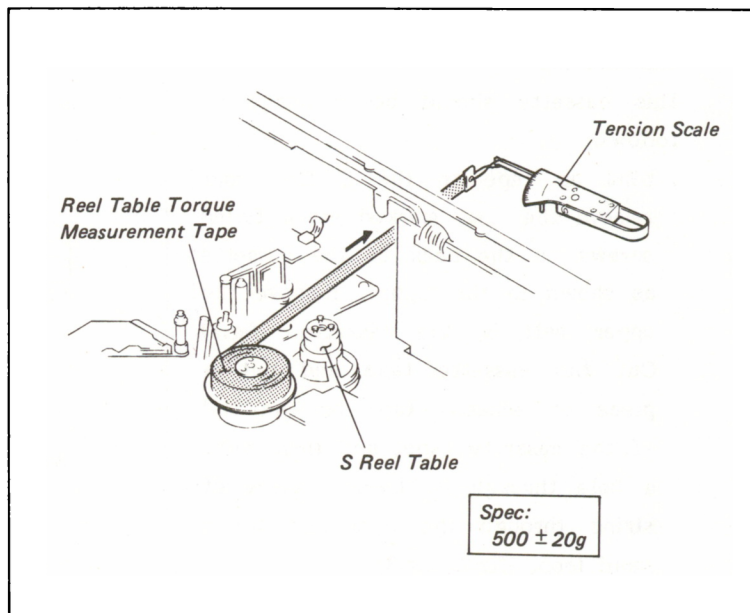
Mode: STANDBY ON mode

Check procedure:

- (1) Set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to ON.
- (2) Turn the POWER ON.
- (3) Put the unit into the Threading completion mode, press the STANDBY button.
- (4) Place the jig tape on the T Reel Table and hook the tension scale to the end of the jig tape. Pull out the tape as shown in the figure.
- (5) Press the STANDBY button and put the unit into the STANDBY ON mode. Check that the scale reading meets the required specification.
- (6) If it meets the required specification, press the STANDBY button and then remove the jig tape. Put the unit into the Threading completion mode, set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to OFF.

Adjustment procedure:

- (1) Adjust the RV1 of the DR-53 Board to meet the required specification.
- (2) After adjustment, press the STANDBY button and remove the jig tape. Put the unit into the Threading completion mode, set the Bit 5, Bit 6, Bit 7 of S201 and S202 on the SV-88C Board to OFF.



7-5. FWD BACK TENSION ADJUSTMENT

Tool: Back tension measurement special cassette tape

This cassette should be prepared as follows:

- Wind up tape to the S Reel and remove the * marked seven fixing screws on the back of the cassette as shown in the figure. Remove the upper half of the cassette. (fig.1) Cut the cassette tape and put a piece of adhesive tape on the end of the cassette tape, and then make a hole through it. Lace a piece of string through the hole and tie a small loop. (fig.2, fig.3)

Tension scale (100 g full scale)

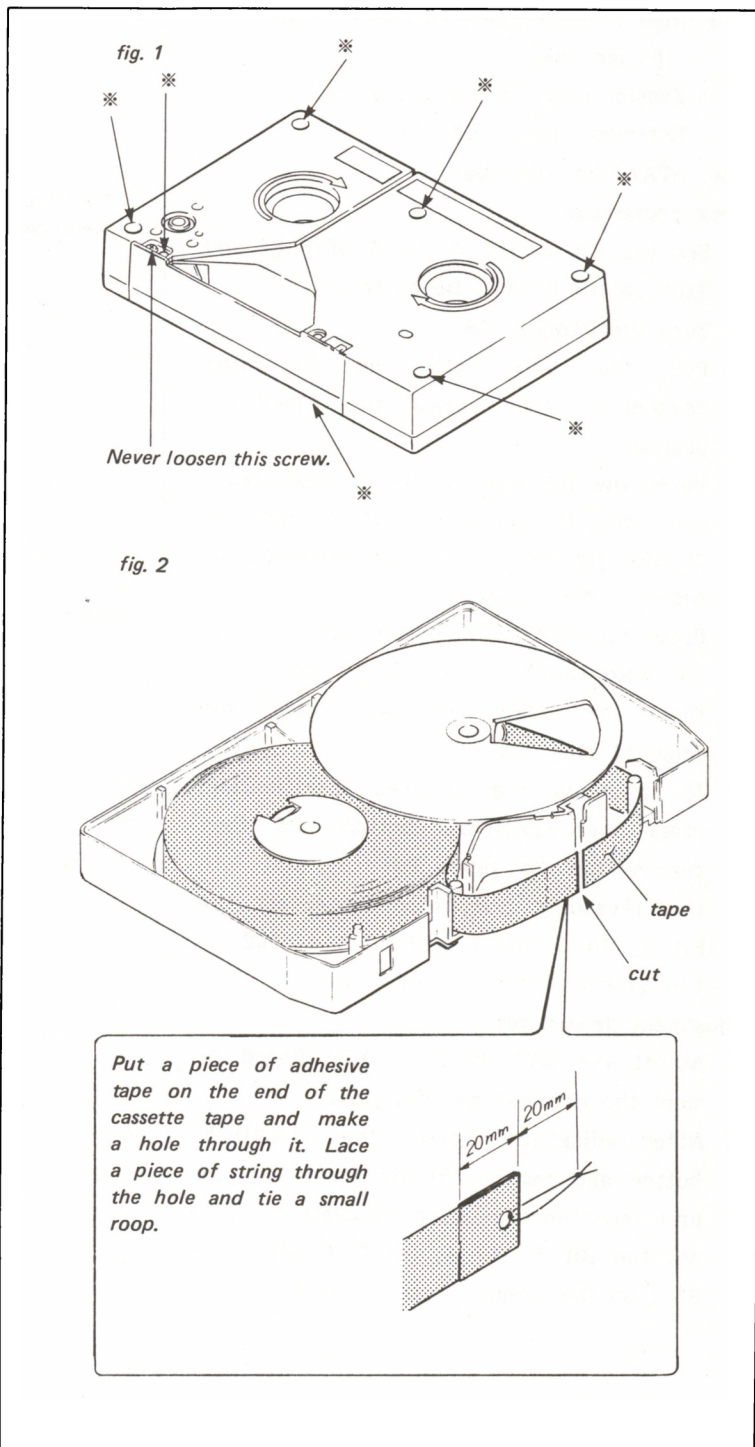
Extension board (EX-128)

Preparation:

- (1) Set the Bit 7 of S201 on the SV-88C Board to ON. Short between TP10 and E1 on the SY-102B Board with a shorting clip from the entrance of the Time Code Board.

Check procedure:

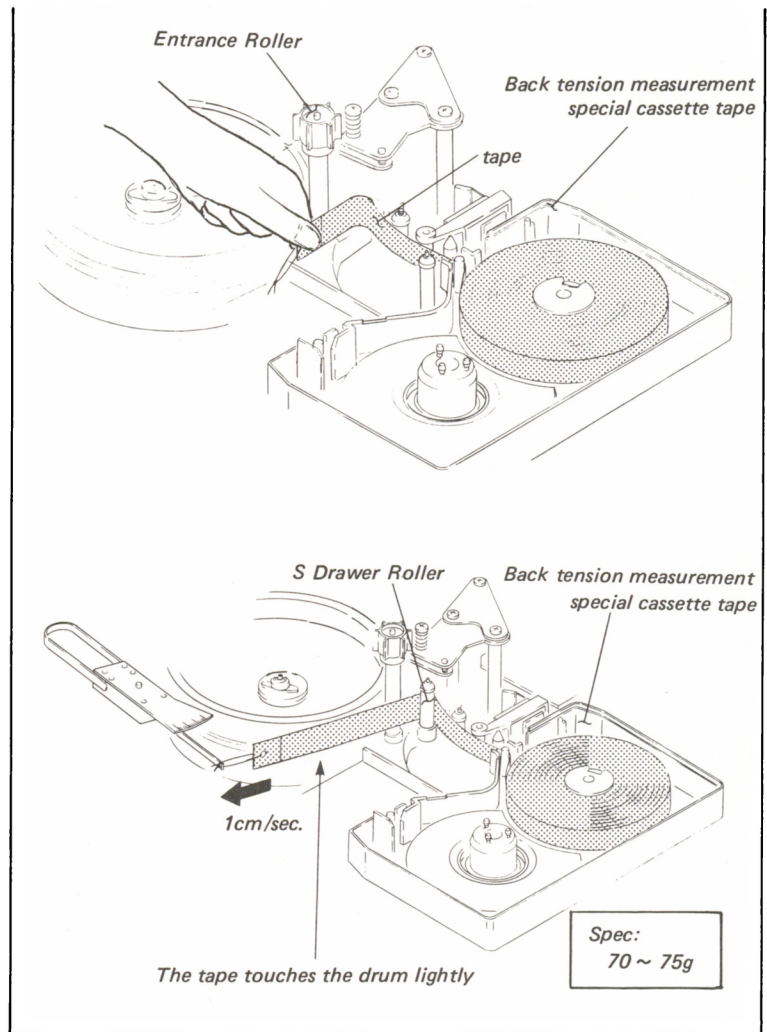
- (1) Turn the SKEW control knob to center detent portion.
- (2) Place the special cassette tape on the reel tables and pull out the tape as shown in the figure.
- (3) Hold the special tape with a hand securely at the position as shown in the figure. Turn the power ON and put the unit into the STOP mode.
- (4) Put the unit into the STANDBY OFF mode and hook the tension scale to the end of the special tape. Be sure that the tape does not curl at the upper or lower flange of the S Drawer Roller.



- (5) Put the unit into the PLAY mode. Pull out the tape at a constant speed of approx. 1cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.
- (6) If it is within the specification, put the unit into the STANDBY OFF mode. Remove the tension scale from the special tape.
- (7) Remove the special tape from the reel tables and put the unit into the EJECT mode.
- (8) Set the Bit 7 of S201 on the SV-88C Board to OFF and remove the shorting clip from the SY-102B Board.

Adjustment procedure:

- (1) Adjust the RV401 on the SV-88C Board to meet the required specification.



SECTION 8

TAPE RUN ALIGNMENT

8-1. T CORRECTION GUIDE SLANTNESS ADJUSTMENT

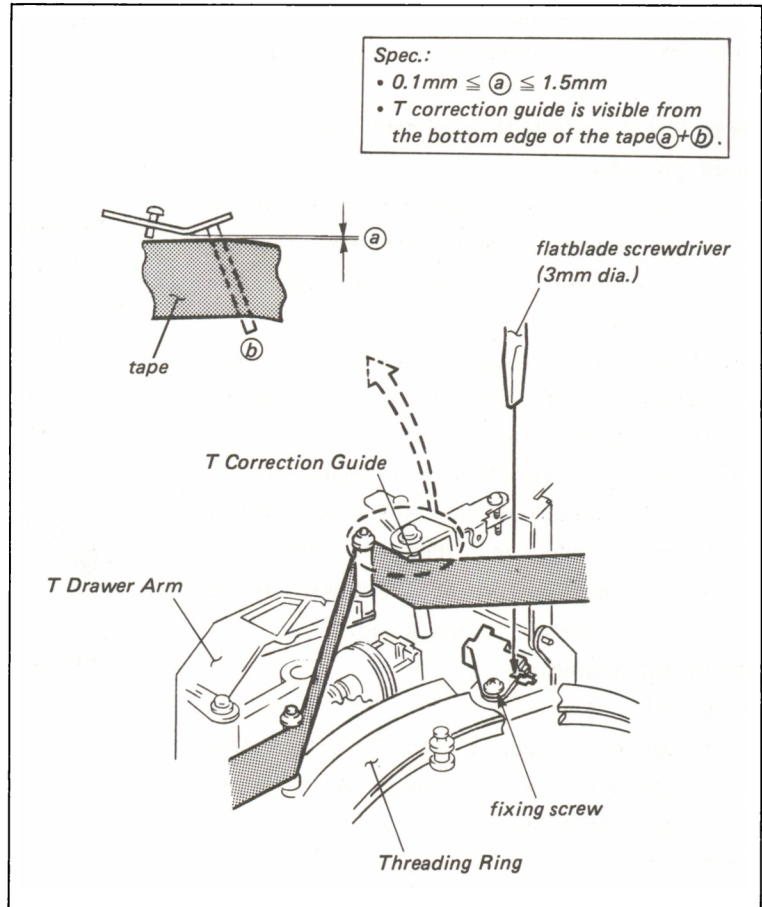
Tool: Dental mirror

Check procedure:

- (1) Insert a KCA-60 cassette tape and put the unit into the Threading mode. Just as the Pinch Roller passes in front of the T Correction Guide, quickly turn the power OFF.
- (2) Check that the clearance between the upper bracket of the T Correction Guide and the top edge of the tape meets the required specification.

Adjustment procedure:

- (1) Loosen the fixing screw of the T Correction Guide 1/4 to 1/2 turn.
- (2) Adjust the position of the T Correction Guide with a flatblade screwdriver (3 mm dia.) to meet the required specification.
- (3) After adjustment, perform Section 8-2, PLAY Mode Tape Path Adjustment (1).



8-2. PLAY MODE TAPE PATH ADJUSTMENT (1)

. It is required that Section 8-1, T Correction Guide Slantness Adjustment and Section 8-4, FF/FWD Mode Tape Path Adjustment are correct before initiating this adjustment.

Mode: PLAY mode with a cassette tape

Check procedure:

- (1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes). Put the unit into the PLAY mode.
- (2) Check that the tape runs without any curling at the upper or lower flange of the T Drawer Guide. (Spec. (1))
- (3) Check that tape tension is equal at the top and bottom of the tape around the T Drawer Guide, and that the tape runs without any curling at the lower flange of the T Drawer Guide. (Spec.(2))

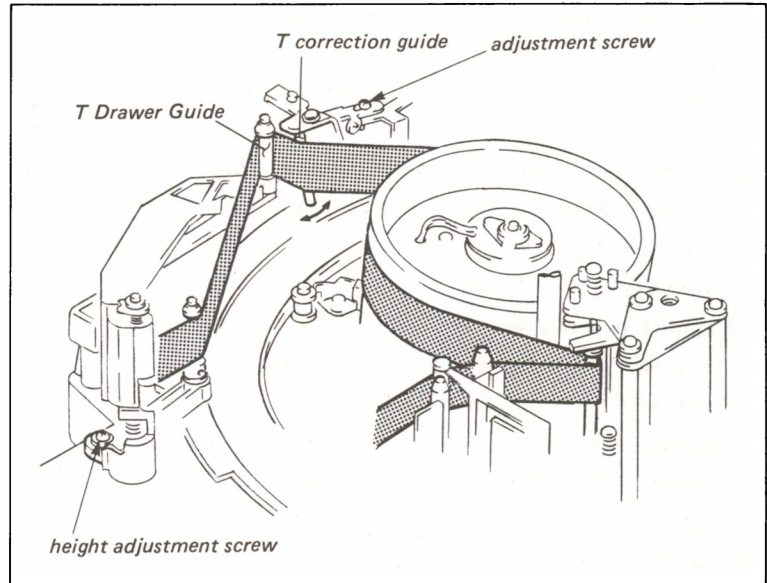
Adjustment procedure:

For Spec.1

- (1) Adjust the height of the T Drawer Arm by turning the T Drawer Arm Height Adjustment Screw.

For Spec.2

- (2) Bend the T Correction Guide in the direction of the arrow. Turn the adjustment screw if necessary to meet the required specification.



8-3. PLAY MODE TAPE PATH ADJUSTMENT (2)

Tool: Dental mirror

Mode: PLAY mode with a cassette tape

Check procedure:

- (1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes). Put the unit into the PLAY mode.
- (2) At the * marks (two positions) in the figure, check that tape tension is equal at the top and bottom of the tape. (Spec.(1))
- (3) Check that the clearance between the lower flange of the Threading Roller and the bottom edge of the tape meets the required specification (2).

Adjustment procedure:

- (1) Loosen the set screw at the top of the Threading Roller 1/2 to 1 turn.

For Spec.1

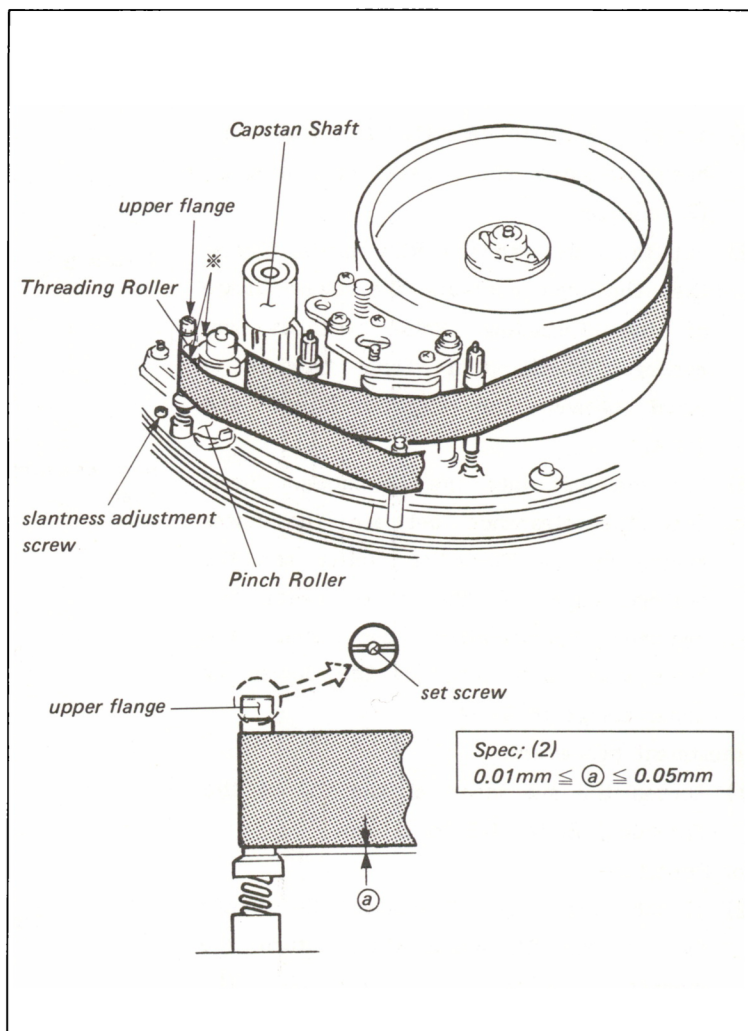
- (2) Adjust the slantness of the Threading Roller by turning the slantness adjustment screw.

NOTE:

- (i) After adjustment, perform Section 8-4, FF/REW Mode Tape Path Adjustment.

For Spec.2

- (3) Adjust the height of the Threading Roller by turning the upper flange of the Threading Roller.
- (4) Check that the slantness and the height meet the required specifications (1) and (2).
- (5) After adjustment, tighten the set screw and perform the check procedure.



8-4. FF/REW MODE TAPE PATH ADJUSTMENT

Tool: Dental mirror

Mode: FF/REW mode with a cassette tape

Check procedure:

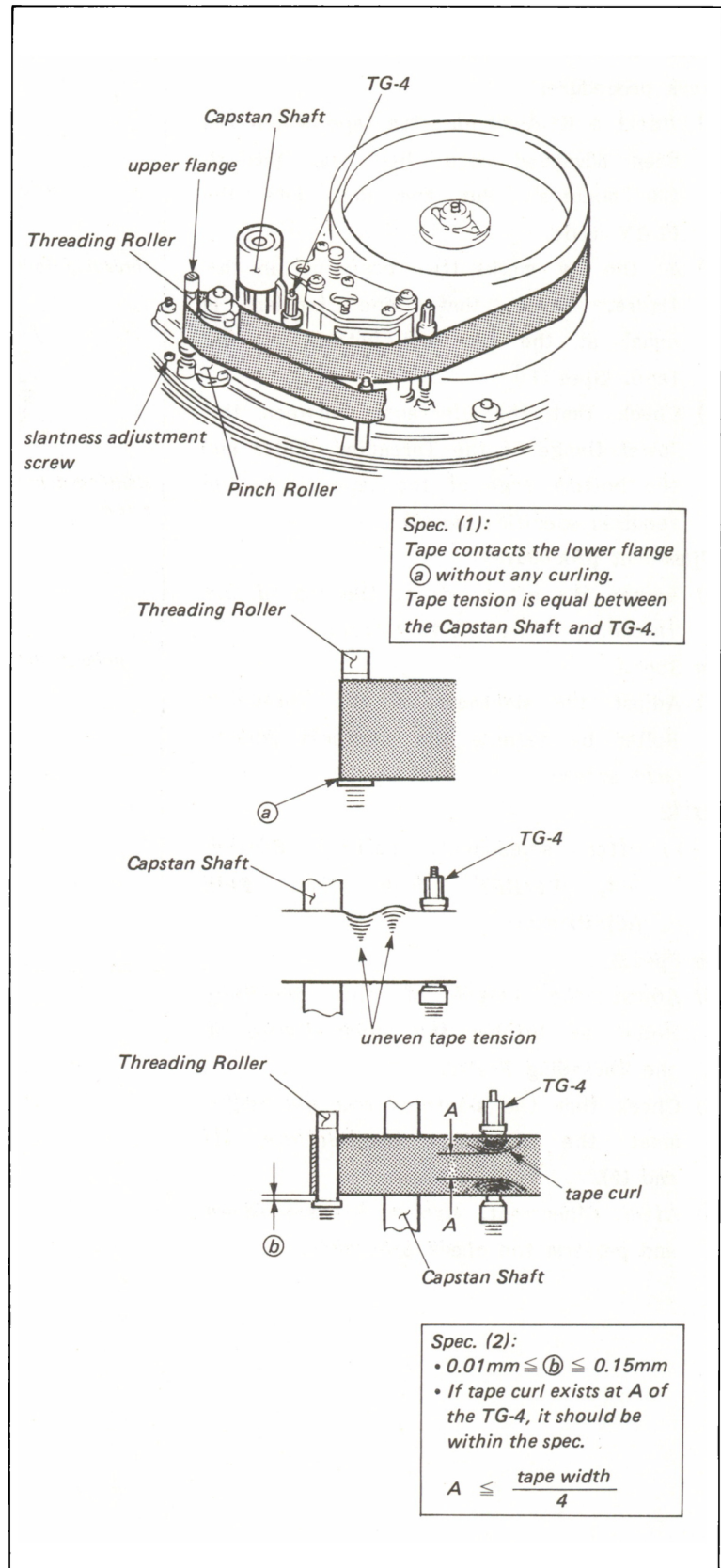
- (1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes).
- (2) Put the unit into the REW mode. Check that the tape contacts the lower flange of the Threading Roller without any curling. Check that tape tension is equal between the Capstan Shaft and TG-4.
- (3) Put the unit into the FF mode. Check that the clearance between the lower flange of the Threading Roller and the bottom edge of the tape meets the required specification and that the tape does not curl at the lower or upper flange of TG-4.

Adjustment procedure:

- (1) Loosen the set screw at the top of the Threading Roller 1/2 to 1 turn.

For Spec.1

- (2) If the tape does not contact the flange "a" of the Threading Guide, turn the slantness adjustment screw in the clockwise direction until the tape contacts the flange.
- (3) If tape tension is not equal between the Capstan Shaft and TG-4, turn the upper flange of the Threading Roller until tape tension is equal.



For Spec.2

- (4) When there is no clearance at the Threading Roller "b", turn the upper flange of the Threading Roller to meet the required specification. (If spec.(2) is contradictory to spec.(1), then spec.(1) has priority over spec.(2).)
- (5) If the tape curls at the upper flange of the Threading Roller, note clearance "B" at the Threading Roller. When there is clearance at "B", put the unit into the PLAY mode. Note that the tape curls at TG-4.
- (6) If the tape curls at TG-4 in the PLAY mode, perform Section 8-8, Tracking Adjustment.
- (7) If the tape runs without any curling in the PLAY mode, replace the Pinch Roller Block with a new one.
- (8) After adjustment, perform Section 8-3, PLAY Mode Tape Pass Adjustment (2).

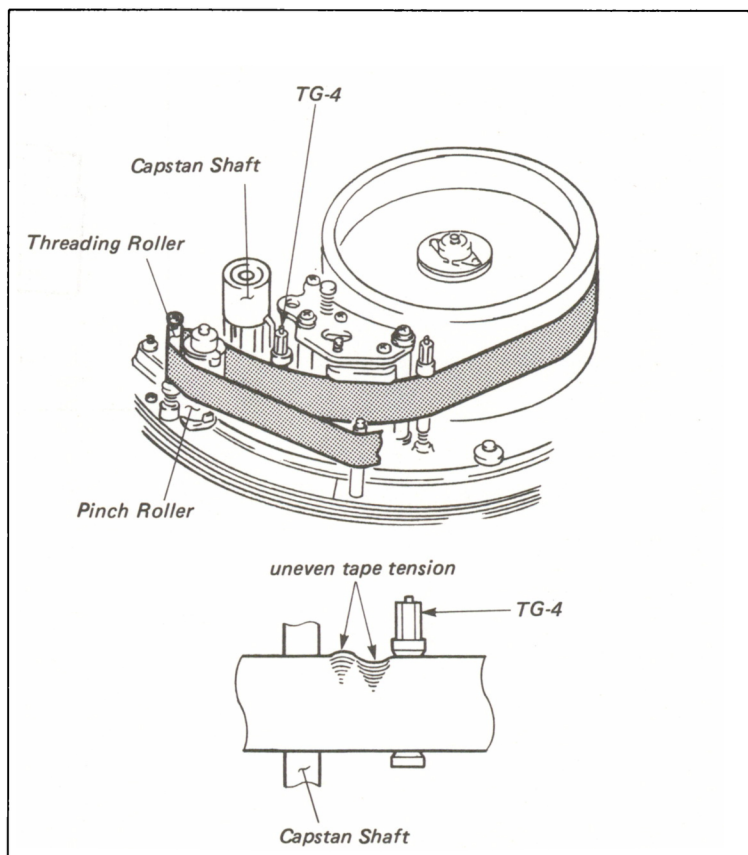
8-5. FWD X 5 / REV X 5 SERCH MODE TAPE PATH ADJUSTMENT

Check procedure:

- (1) Insert a KCA-60 cassette tape which has been advanced about half way through (30 minutes).
- (2) When the unit is switches directly from the REV X 5 mode to the FWD X 5 mode (or the reverse), check that tape tension is equal between the Capstan Shaft and TG-4. If tape tension is not equal, check that the wrinkle disappears within 2 seconds.

Adjustment procedure:

- (1) Perform Section 8-3, PLAY Mode Tape Pass Adjustment (2) and Section 8-4, FF / REW Mode Tape Pass Adjustment to meet the required specification.



8-6. AUDIO HEAD ZENITH ADJUSTMENT

Tool: Flatness plate

Check procedure:

- (1) Place the Flatness Plate against TG-3 and the Audio Head. Check that the clearance between the Audio Head and the Flatness Plate meets the required specification. Do not set a Flatness Plate against the top of TG-3.

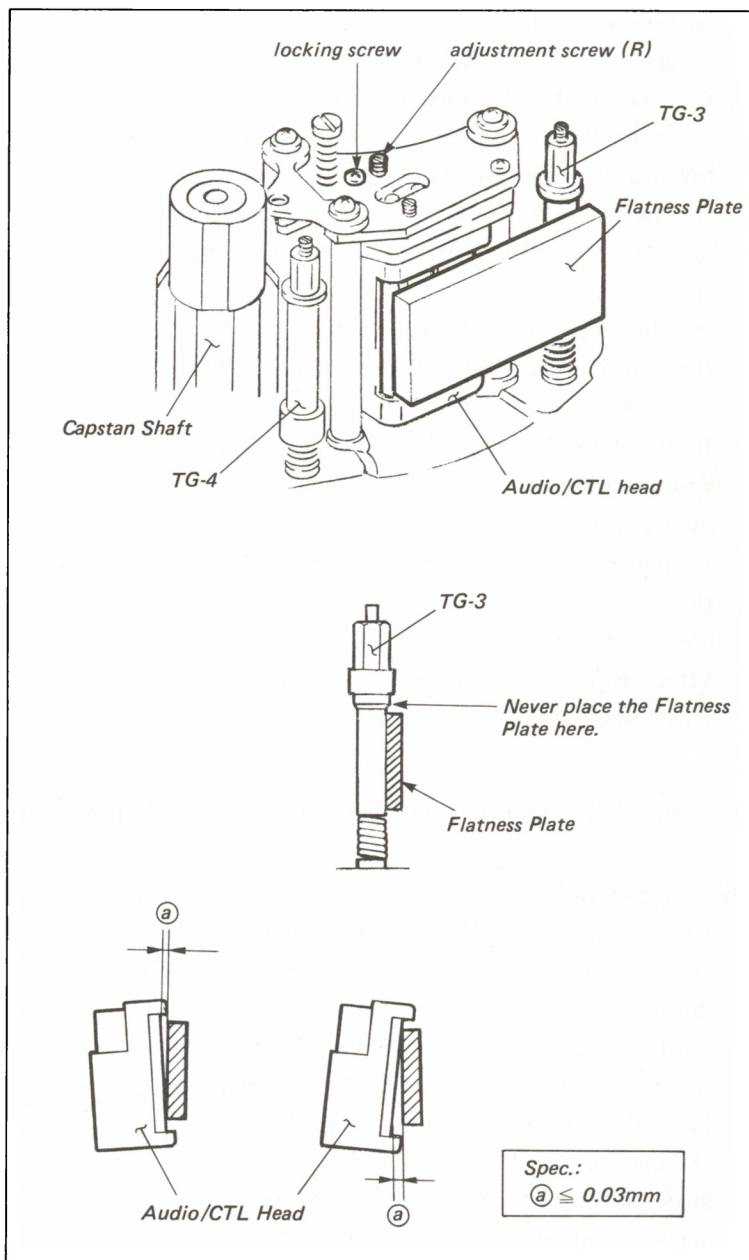
Adjustment procedure:

. When the clearance between the Flatness Plate and the top of the Audio Head is out of the specification:

- (1) Turn adjustment screw (R) in the counterclockwise direction.
- (2) After adjustment, tighten the locking screw and perform the check procedure.

. When the clearance between the Flatness Plate and the bottom of the Audio Head is out of the specification:

- (3) Loosen the locking screw 1/4 to 1/2 turn. Turn adjustment screw (R) in the clockwise direction.
- (4) After adjustment, tighten the locking screw and perform the check procedure.



8-7. TIME CODE HEAD ADJUSTMENT

- . The Time Code Head is located near the drum. During adjustment of the Time Code Head, be sure to not damage the video head or scratch the drum.
- . The Time Code Head Zenith Adjustment is closely related to the Azimuth Adjustment and the Height Adjustment. When performing any of these adjustments, always perform the other two adjustments at the same time.

8-7-1. Time Code Head Zenith Adjustment

Tool: Flatness plate

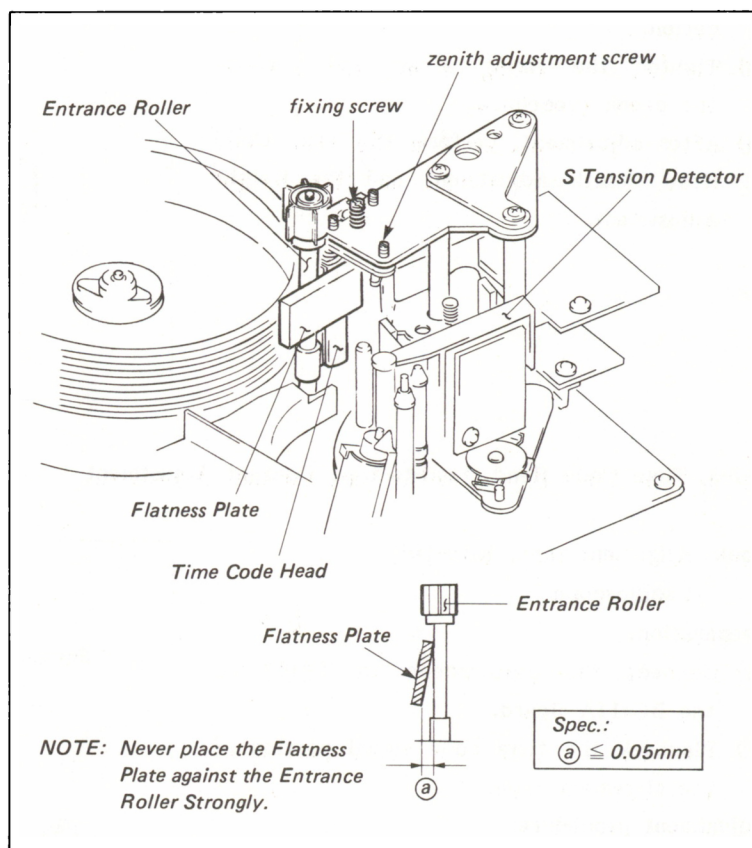
Mode: EJECT completion mode

Check procedure:

- (1) Place the Flatness Plate against the Entrance Roller and the Time Code Head. Check that the clearance between the Entrance Roller and the Flatness Plate meets the required specification.

Adjustment procedure:

- (1) Loosen the fixing screw 1/4 to 1/2 turn.
- (2) Adjust the zenith of the Time Code Head by turning the zenith adjustment screw to meet the required specification.
- (3) Tighten the fixing screw and perform the check procedure.
- (4) After adjustment, perform the Time Code Head Azimuth Adjustment and the Height Adjustment.



8-7-2. Time Code Head Azimuth Adjustment

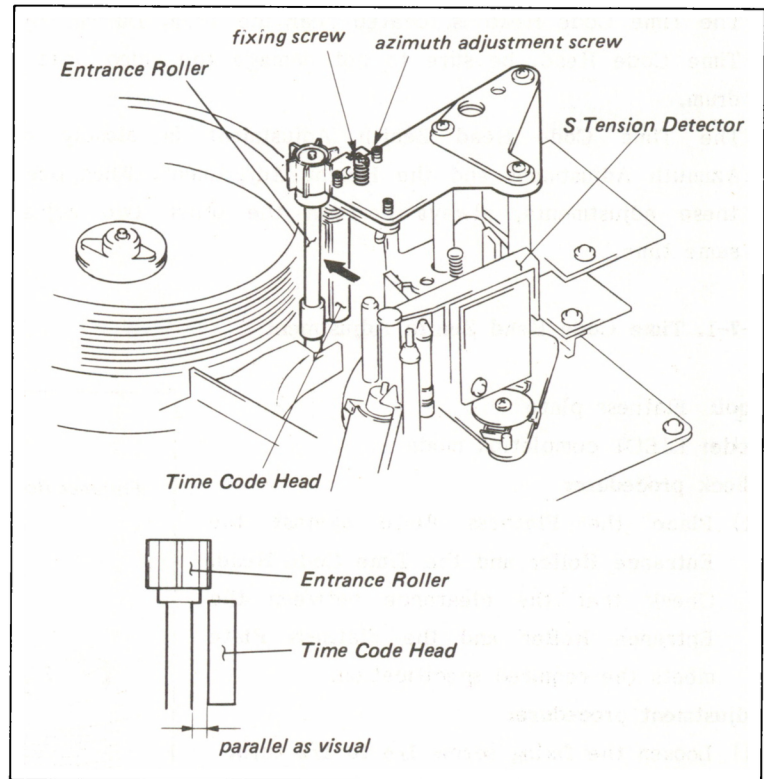
Mode: EJECT completion mode

Check procedure:

- (1) Check that the clearance between the top or the bottom of the Time Code Head and the Entrance Roller is parallel.

Adjustment procedure:

- (1) Loosen the fixing screw 1/4 to 1/2 turn.
- (2) Adjust the azimuth of the Time Code Head by turning the azimuth adjustment screw to meet the required specification.
- (3) Tighten the fixing screw and perform the check procedure.
- (4) After adjustment, perform the Time Code Head Zenith Adjustment and the Height Adjustment.



8-7-3. Time Code Head Head-to-tape Contact Adjustment

Tools: Alignment tape, RR5-1SD

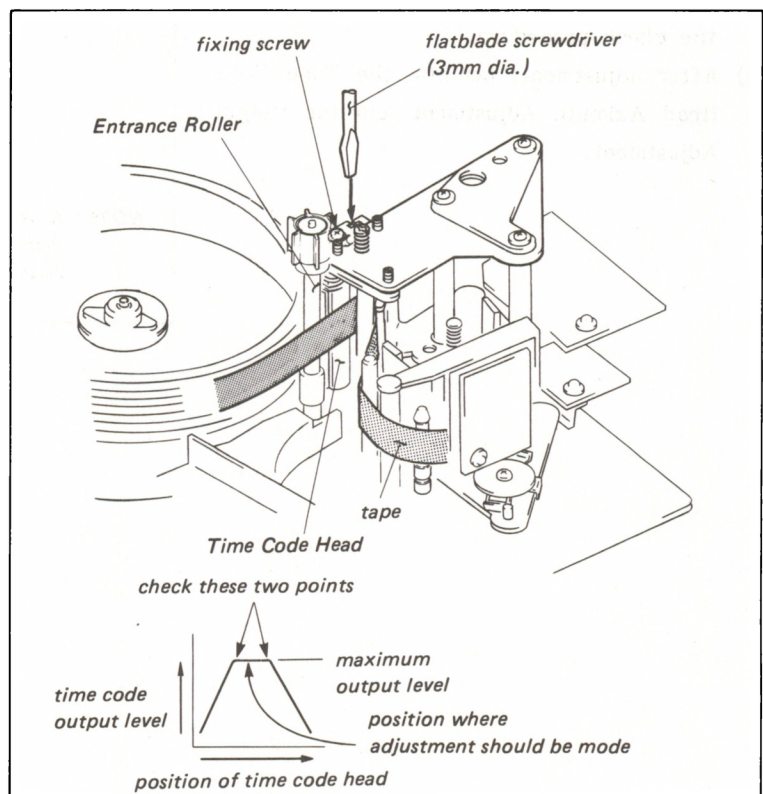
Oscilloscope

Preparation:

- (1) Connect the oscilloscope to TP102 on the BC-11A Board.
- (2) Playback the time code signal portion of the alignment tape.

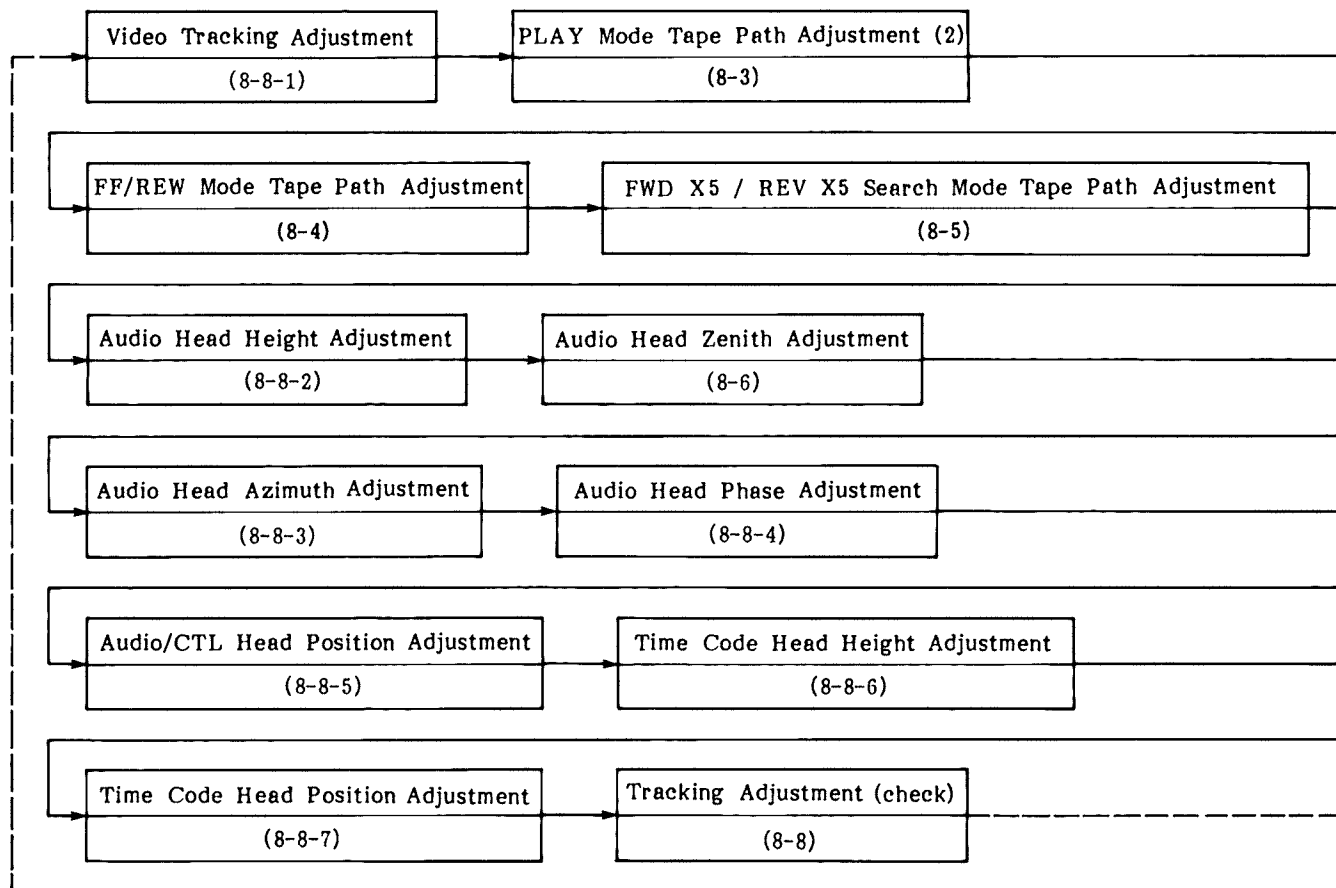
Adjustment procedure:

- (1) Loosen the fixing screw of the head-to-tape contact adjustment 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (3mm dia.) into the notch as shown in the figure. Find the two points where the output waveform is at maximum and just starts to decrease.
- (3) Adjust the position of the Time Code Head Block with a flatblade screwdriver (3 mm dia.) to the center of these two points. After adjustment, tighten the fixing screw.



8-8. TRACKING ADJUSTMENT

. The Tracking Adjustment is required to be performed in the following order:



8-8-1. Video Tracking Adjustment

Tools: Alignment tape, RR2-1SD
Flatness plate
Dental mirror
Extension board (EX-128)
Oscilloscope

Preparation:

- (1) Set the Bit 8 of S201 on the SV-88C Board and check that the Bit 7 is set to OFF. Check that the S202 is set to OFF.
- (2) Extend the DM-54A Board with the extension board.
- (3) Connect the oscilloscope to TP18 on the DM-54A Board and EXT.TRIG to TP4 on the DM-54A Board.
- (4) Playback the alignment tape.

Check procedure:

- (1) While turning the TRACKING control knob, check that the RF waveform maintains a flat envelope while the amplitude increases and decreases.
- (2) Check that fluctuation and head-to-tape contact of the RF envelope are within the specification at the center detent position of the TRACKING control knob.
- (3) After check, if meets the required specification, reset the S201 and S202 on the SV-88C Board.

Adjustment procedure:

. The S Drawer Roller Block has three adjustment screws. These three adjustment screws function as follows:

(i) Slantness adjustment screw (a)

Turn this screw in the clockwise direction, and the S Drawer Roller slants in the direction of arrow A.

(ii) Slantness adjustment screw (b)

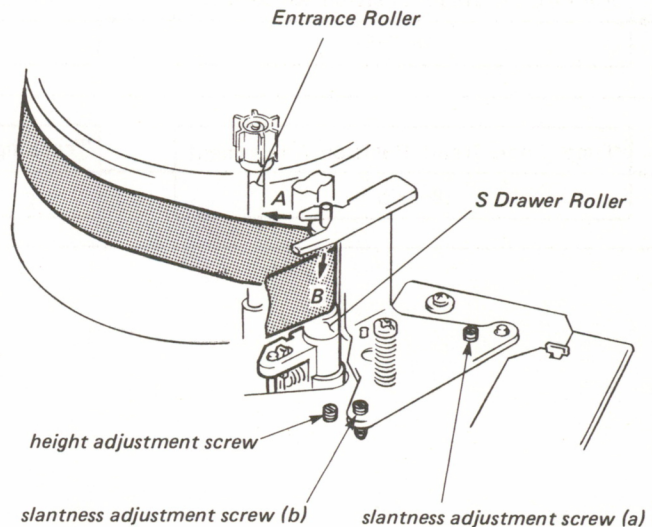
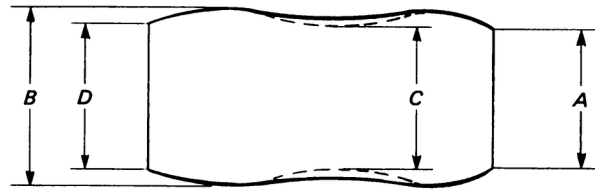
Turn this screw in the counterclockwise direction, and the S Drawer Roller slants in the direction of arrow B. This screw is used for removing tape curl at the upper flange of the S Drawer Roller. However, this screw is used only when the tape curls at the flange of the S Drawer

Spec.: Turn the SKEW
Volume to center
click.

$$\frac{A}{B} \geq 0.80 \quad \frac{D}{B} \geq 0.80$$

(fluctuation)

$$\frac{C}{B} \geq 0.90$$



Roller, even though the RF output waveform meets the required specification.

(iii) Height adjustment screw

Turn this screw in the clockwise direction, and the height of the S Drawer Roller lowers.

- . When tape guides (TG-3, TG-4) are adjusted, loosen the locking screw about 1 turn and adjust the height by turning the height adjustment nut.

. When tracking at the entrance side of the drum is not good.

- (1) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80 % of maximum.
- (2) Adjust the height and the slantness of the S Drawer Roller by turning the height adjustment screw and the slantness adjustment screw (a) until the RF envelope of the entrance side is flat.

NOTE:

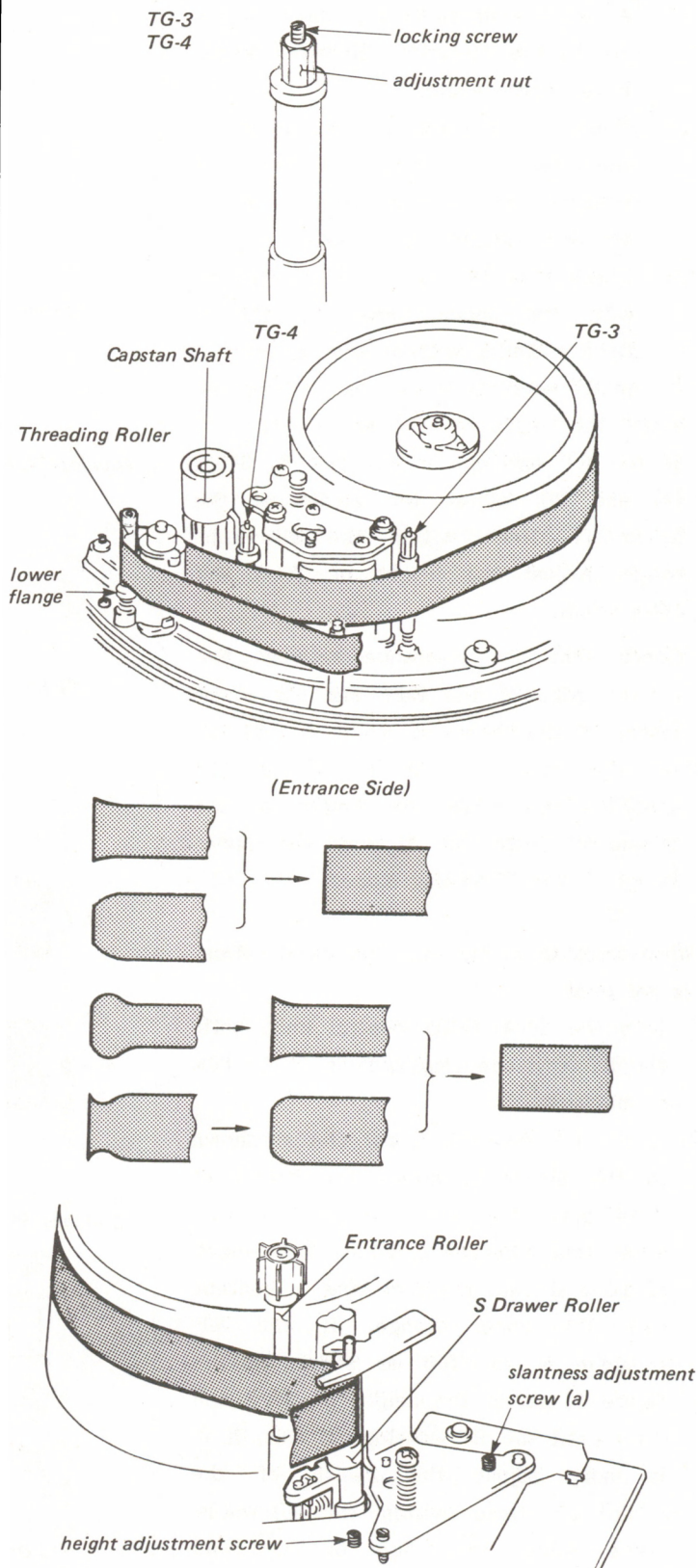
(i) Check the surface of the running tape very carefully around the S Drawer Roller. Check that tape tension is equal at the top and bottom of the tape.

(ii) Check that the tape runs in contact with the upper flange of the S Drawer Roller without any curling.

. When tracking at the center of the drum is not good.

(It is required that the Tracking adjustment at the entrance side of the drum is correct before initiating this adjustment.)

- (3) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80% of maximum.
- (4) Adjust the height and the slantness of the S Drawer Roller by turning the height adjustment screw and the slantness adjustment screw (a) until the RF envelope at the center of the drum is flat.

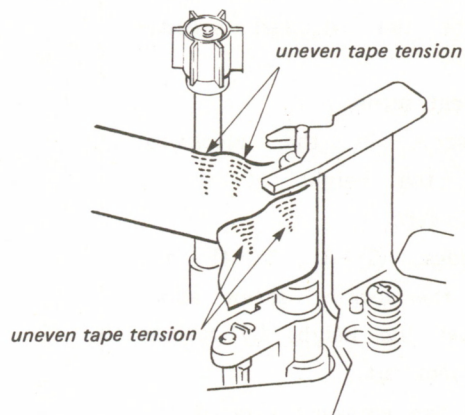


NOTE:

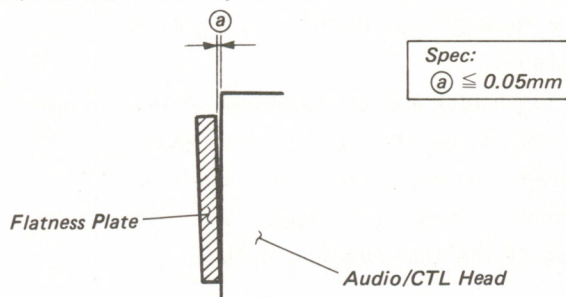
- (i) Adjust the slantness adjustment screw (a) in the clockwise direction within a 10 degree angle.
 - (ii) When the tracking of the center of the drum is adjusted, the RF envelope at the entrance side of the drum should remain flat.
 - (iii) Check that the tape runs in contact with the upper flange of the S Drawer Roller without any curling.
- (5) If the RF envelope is not flat in Step (4), adjust the height of TG-3 and TG-4.
- (6) If the RF envelope is not flat in Steps (4) and (5), adjust the zenith of the Audio/CTL Head within the allowable range. Adjust the height of TG-3 and TG-4 again.
- (7) Check that the clearance between the bottom edge of the tape and the lower flange of the Threading Roller is 0.01 mm to 0.05 mm. If it is out of the specification, adjust the height of the Threading Roller by turning the upper flange of the Threading Roller.

. When tracking at the exit side of the drum is not good.

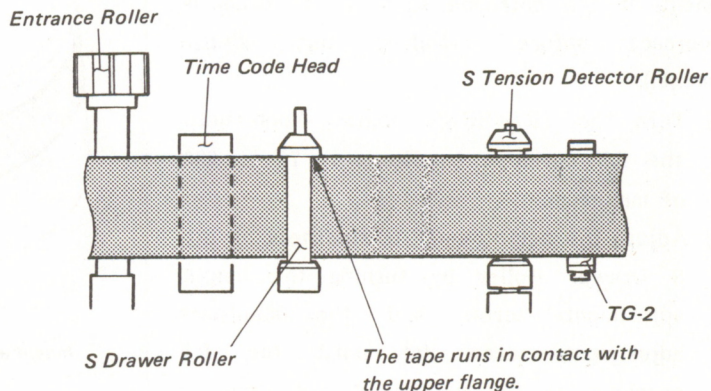
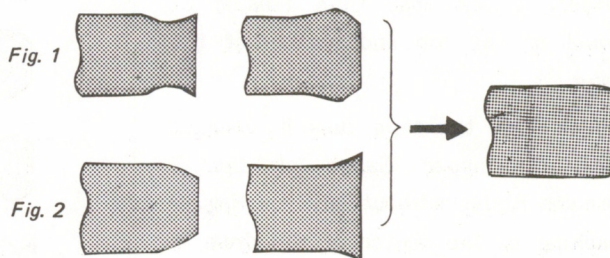
- (8) Turn the TRACKING control knob until the RF envelope amplitude is 70 to 80% of maximum.
- (9) If the RF envelope is not flat as shown in the figure 1, adjust the height of TG-4 until the RF envelope is flat. After this adjustment, adjust the height of TG-3 so that the tape runs in contact with the upper flange. If the RF envelope is not flat as shown in the figure 2, adjust the height of TG-3 and TG-4 until the RF envelope is flat. If it is not, adjust the zenith of the Audio/CTL Head within the allowable range. Adjust the height of TG-3 and TG-4 again.



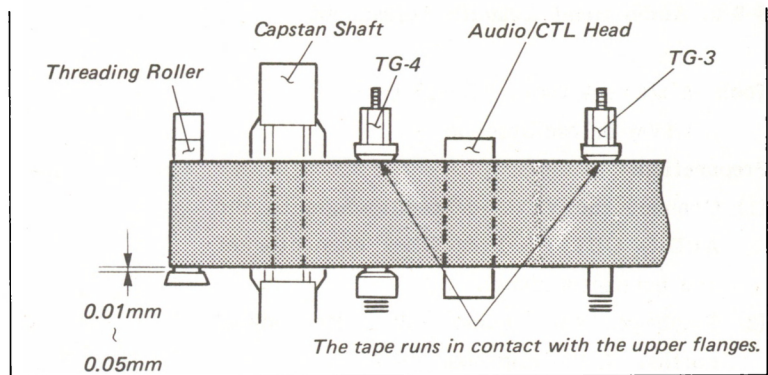
(Audio/CTL Head Zenith Adjustment)



(Exit Side)



- (10) Check that the clearance between the bottom edge of the tape and the lower flange of the Threading Roller is 0.01 mm to 0.05 mm. If it is out of the specification, adjust the height of the Threading Roller by turning the upper flange of the Threading Roller.
- (11) After adjustment, if meets the required specification, reset S201 and S202 on the SV-88C Board.



8-8-2. Audio Head Height Adjustment

Tool: Alignment tape, RR5-1SD
VTVM or oscilloscope

Preparation:

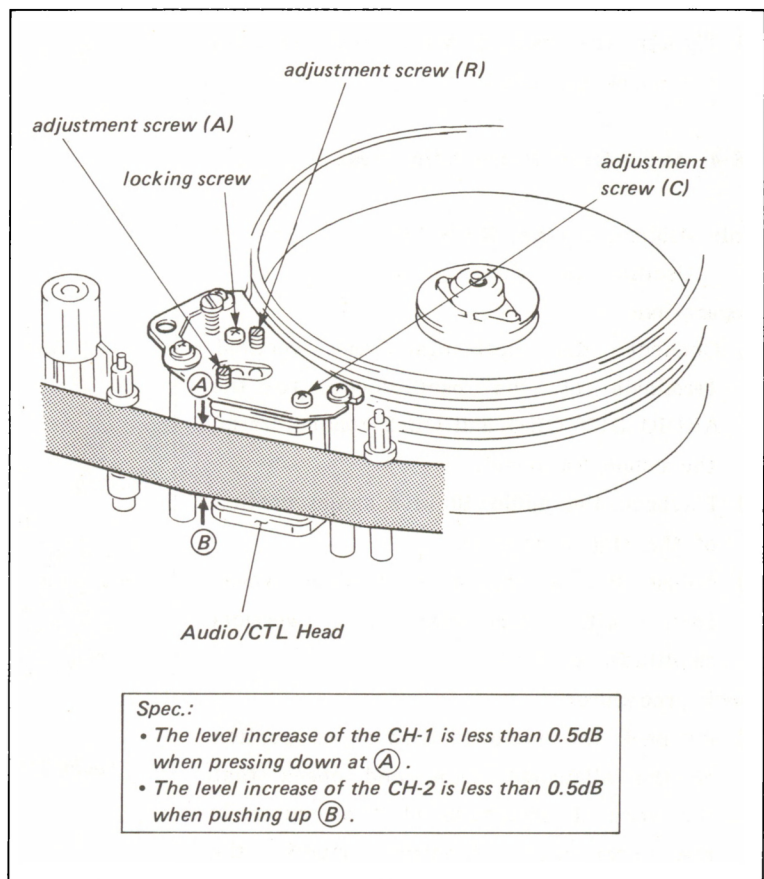
- (1) Connect the VTVM or oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors of the connector panel.
- (2) Playback the audio 1 kHz signal portion of the alignment tape.

Check procedure:

- (1) Check that the CH-1 output level increase is less than 0.5 dB when pressing down at A. If it is out of the specification, perform adjustment procedures (1) and (2).
- (2) Check that the CH-2 output level increase is less than 0.5 dB when pushing up at B. If it is out of the specification, perform adjustment procedures (3) and (4).

Adjustment procedure:

- (1) Loosen the locking screw and turn adjustment screws (R) and (A) an equal amount in the counterclockwise direction. Turn adjustment screw (C) the same amount in the clockwise direction.
- (2) Tighten the locking screw and check the height of the Audio Head again.
- (3) Loosen the locking screw and turn adjustment screws (R) and (A) an equal amount in the clockwise direction. Turn the adjustment screw (C) the same amount in the counterclockwise direction.
- (4) Tighten the locking screw and check the height of the Audio Head as described in the check procedure.



8-8-3. Audio Head Azimuth Adjustment

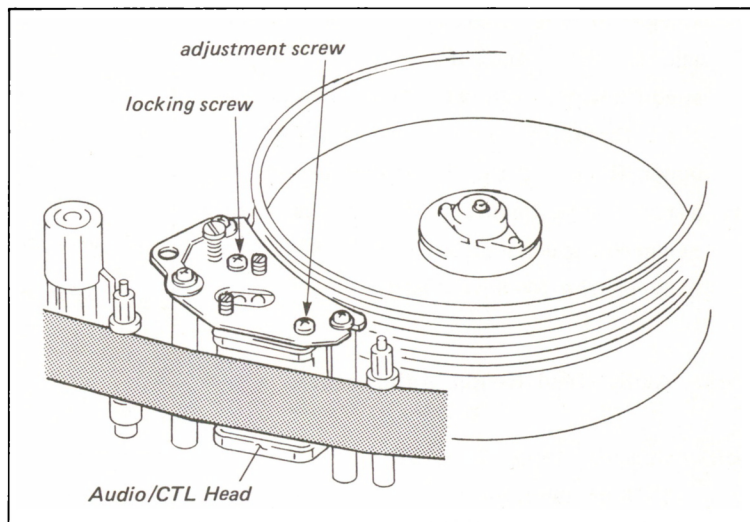
Tool: Alignment tape, RR5-1SD
VTVM or oscilloscope

Preparation:

- (1) Connect the VTVM or oscilloscope to the AUDIO OUT CH-1 or CH-2 connector of the connector panel.
- (2) Playback the audio 10 kHz signal portion of the alignment tape.

Adjustment procedure:

- (1) Loosen the locking screw and adjust the audio output level to maximum by turning the adjustment screw.
- (2) Tighten the locking screw and perform the check procedure.



8-8-4. Audio Head Phase Adjustment

Tool: Alignment tape, RR5-1SD
Oscilloscope

Preparation:

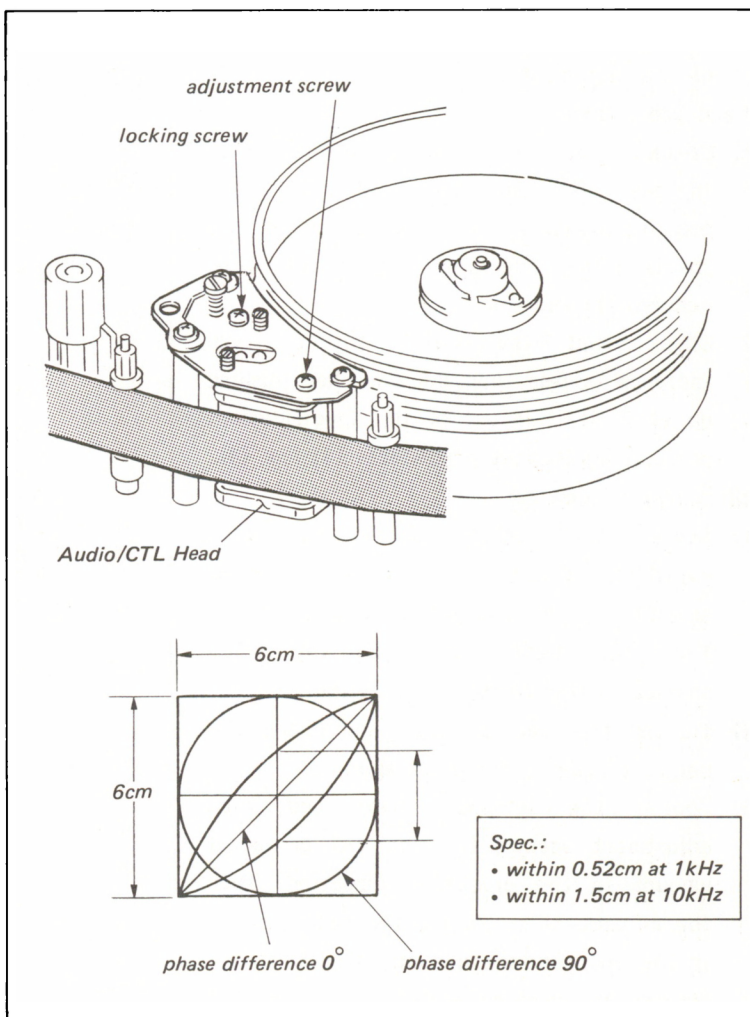
- (1) Connect the horizontal and vertical terminals of the oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors of the connector panel.
- (2) Playback the audio 10 kHz signal portion of the alignment tape.
- (3) Adjust the scope for a lissajous waveform with horizontal and vertical amplitudes of 6 cm.

Check procedure:

- (1) Playback the audio 10 kHz signal portion of the alignment tape, and check that the vertical amplitude at the center in the horizontal direction meets the required specification.
- (2) Playback the audio 1 kHz signal portion of the alignment tape, and check that the lissajous waveform meets the required specification.

Adjustment procedure:

- (1) Loosen the locking screw 1/4 to 1/2 turn and adjust the phase by turning the adjustment screw.
- (2) Tighten the locking screw and check the phase again.



8-8-5. Audio/CTL Head Position Adjustment

Tool: Alignment tape, RR2-1SD
Eccentric screwdriver (5 ϕ)
Extension board (EX-128)
Oscilloscope

Preparation:

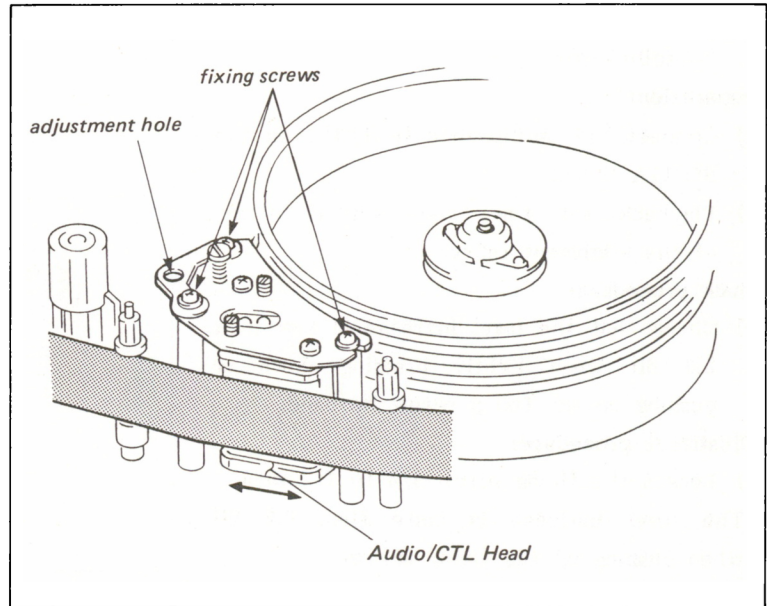
- (1) Extend the DM-54A Board with the extension board.
- (2) Connect the oscilloscope to TP18 on the DM-54A Board and the EXT.TRIG to TP4 on the DM-54A Board.
- (3) Playback the alignment tape.

Check procedure:

- (1) While turning the TRACKING control knob, check that the RF envelope has maximum amplitude at the center detent position of the TRACKING control knob.

Adjustment procedure:

- (1) Loosen the three fixing screws 1/4 to 1/2 turn.
- (2) Move the Audio/CTL Head with an eccentric screwdriver (5 ϕ) in the direction of the arrow to meet the required specification.



8-8-6. Time Code Head Height Adjustment

Tool: Alignment tape, RR5-1SD
Oscilloscope

Preparation:

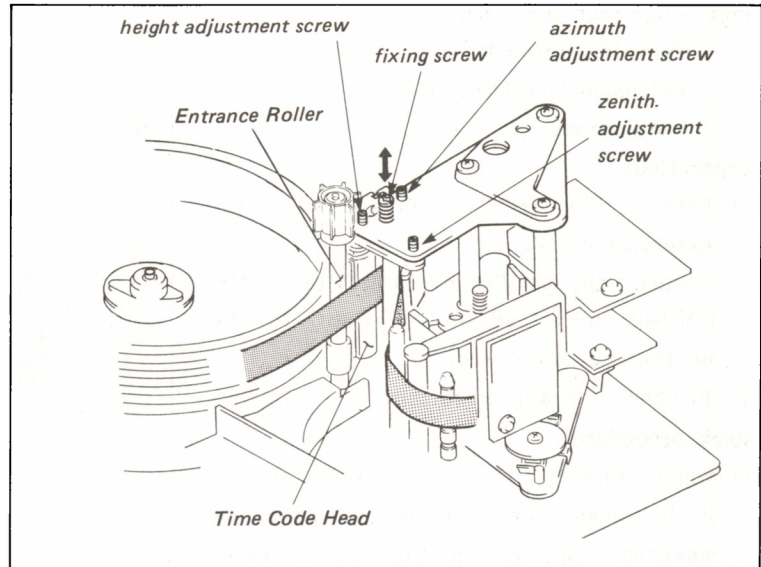
- (1) Connect the oscilloscope to TP102 on the BC-11A Board.
- (2) Playback the time code signal portion of the alignment tape.

Check procedure:

- (1) Check that the level increase is less than 0.5 dB when lightly pressing down or pushing up the fixing screw by hand.

Adjustment procedure:

- (1) Loosen the fixing screw 1/4 to 1/2 turn.
. The level increase is more than 0.5 dB when pushing up the fixing screw.
- (2) Turn the three adjustment screws (Height, Azimuth and Zenith) an equal amount in the counterclockwise direction.
. The level increase is more than 0.5 dB when pressing down the fixing screw
- (3) Turn the three adjustment screws an equal amount in the clockwise direction.
- (4) Tighten the fixing screws and performn the check procedure.
- (5) After adjustment, perform the Time Code Head Zenith Adjustment and Azimuth Adjustment.



8-8-7. Time Code Head Position Adjustment

Tool: Alignment tape, RR5-1SD
Oscilloscope
Eccentric screwdriver (5 ϕ)
Extension board (EX-128, 127)

Preparation:

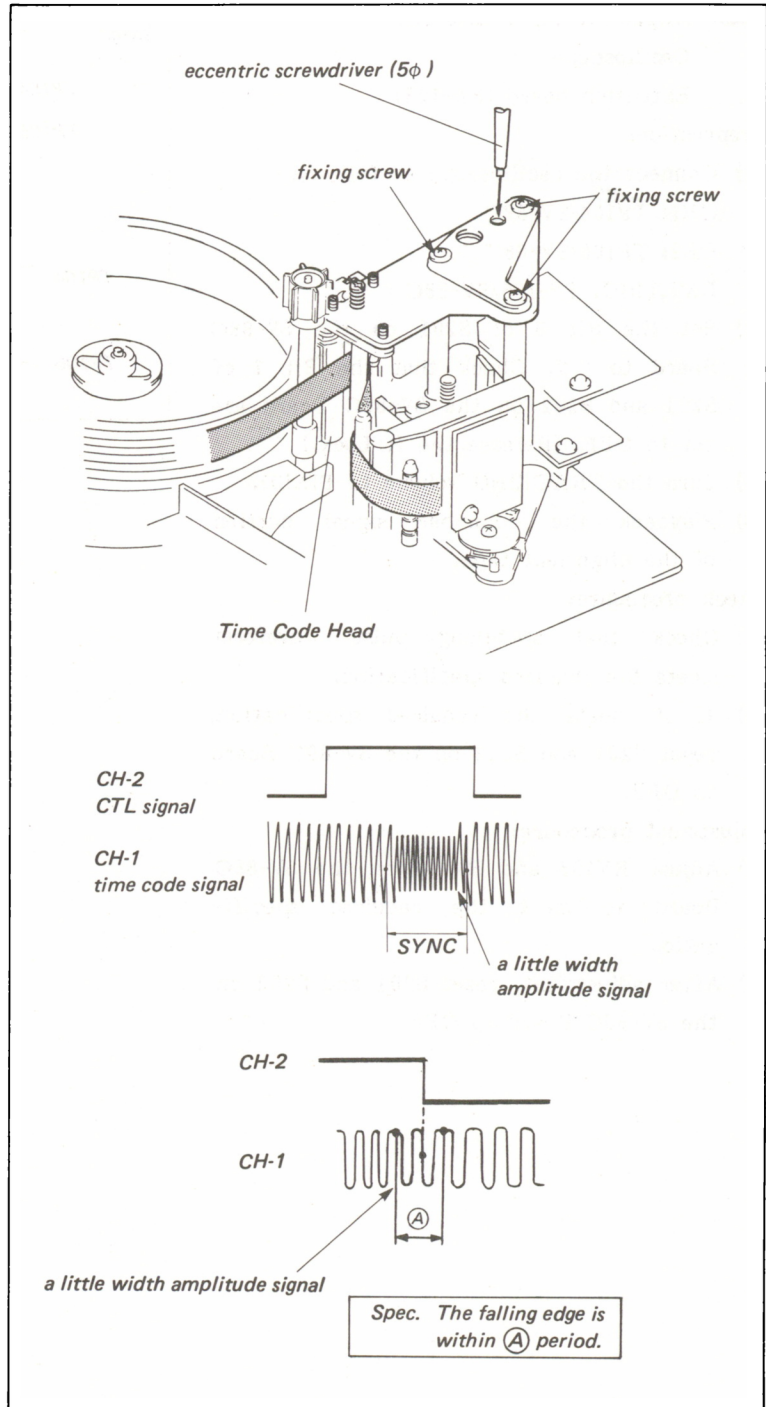
- (1) Connect the oscilloscope as follows.
CH-1 : TP102 / BC-11A
CH-2 : TP203 / SV-88C
TRIG : TP203 / SV-88C
- (2) Playback the time code signal portion of the alignment tape.

Check procedure:

- (1) Check that the phase relationship between the CTL signal and the Time Code signal meets the required specification.

Adjustment procedure:

- (1) Loosen the three fixing screws of the Time Code Head Block 1/4 to 1/2 turn.
- (2) Adjust the position of the Time Code Head Block with an eccentric screwdriver to meet the required specification.



8-8-8. Switching Position Adjustment

Tool: Alignment tape, RR5-1SD
Oscilloscope
Extension board (EX-128)

Preparation:

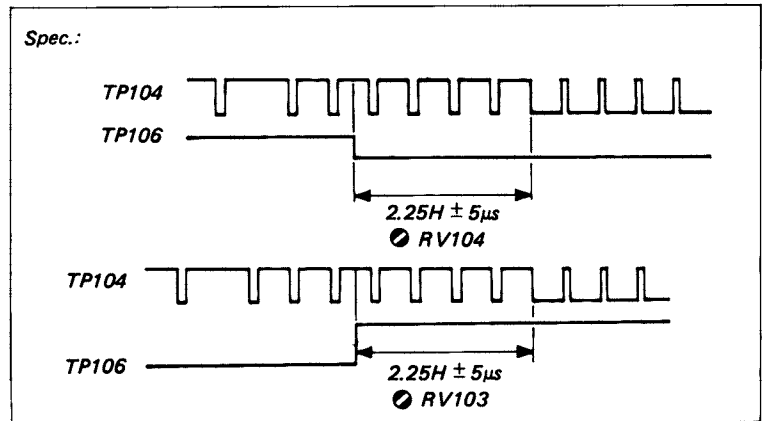
- (1) Connect the oscilloscope as follows:
CH1: TP104/SV-88C
CH2: TP106/SV-88C
EXT.TRIG: TP-106/SV-88C
- (2) Set the Bit 8 of S201 on the SV-88C Board to ON. Check that the Bit 7 of S201 and S202 on the SV-88C Board are set to OFF. (Release the H Lock.)
- (3) Turn the TRACKING volume to FIXED.
- (4) Playback the color-bar signal portion of the alignment tape.

Check procedure:

- (1) Check that switching pulse waveform meets the required specification.
- (2) If it meets the required specification, reset S201 and S202 on the SV-88C Board to OFF.

Adjustment procedure:

- (1) Adjust RV103 and RV104 on the SV-88C Board to meet the required specification.
- (2) After adjustment, reset S201 and S202 on the SV-88C Board to OFF.



8-8-9. Drum Phase Adjustment

Tool: Alignment tape, RR5-1SD

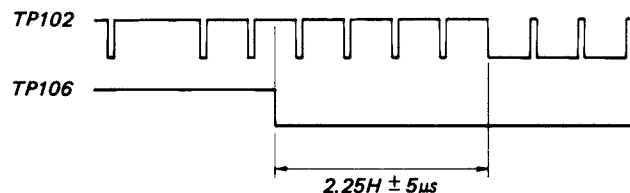
Oscilloscope

Extension Board (EX-128)

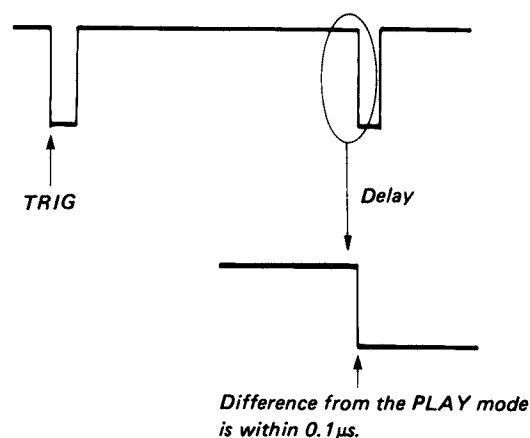
Check procedure:

- (1) Set the Bit 2 of S201 to ON and Bit 1 of S201 to OFF on the SV-88C Board. Set S202 to OFF. Short between TP502 and GND with a shorting clip.
- (2) Inset an alignment tape and put the unit into the PLAY mode.
- (3) Connect the oscilloscope as follows:
CH1: TP102/SV-88C
CH2: TP106/SV-88C
EXT.TRIG: TP203/SV-88C
Check that the waveforms are meet the required specification (1).
- (4) Remove the shorting clip from the SV-88C Board and set the TBC Switch of the connector panel to OFF.
- (5) If the TBC Board is inserted in the unit, open the Function Control Panel and set the INT TBC switch to BYPASS.
- (6) Connect the oscilloscope to TP104 on the SV-88C Board.
- (7) Playback the color-bar signal portion of the alignment tape.
- (8) Magnify the playback H period and adjust the edge of first H signal to senter of the oscilloscope.
- (9) Check that timing difference of the falling edge between the SEARCH STILL mode and PLAY mode meets the required specification (2). (Check the AFC H Difference.)
- (10) Insert a KCA-60 tape wound to the tape beginning portion and put the unit into the SEARCH X 10 mode. Check that H Difference is within the specification (3).

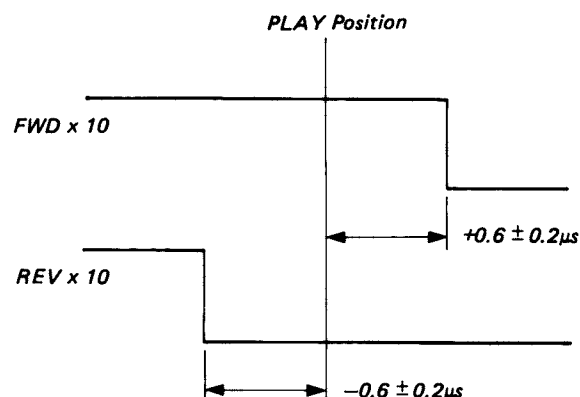
Spec. (1)



Spec. (2)



SPEC. (3)



Adjustment procedure:

- (1) Set the TBC Switch of the connector panel to OFF.
- (2) If the TBC Board is inserted in the unit, open the Function Control Panel and set the INT TBC switch to BYPASS.
- (3) Set the Bit 2 of S201 on the SV-88C Board to ON. Check that the Bit 1 of S201 and the S202 are set to OFF. Short between TP509 and GND with a shorting clip.
- (4) Insert the alignment tape and put the unit into the STILL mode.
- (5) Connect the oscilloscope as follows:
CH1: TP505/SV-88C
CH2: TP512/SV-88C
Adjust RV507 until the voltage level difference between TP505 and TP512 is 0 ± 10 mV.
- (6) Put the unit into the PLAY and STILL modes alternately, adjust RV506 until the voltage level difference of TP505 between the PLAY mode and STILL mode is 0 ± 50 mV.
- (7) Check the Drum Lock Phase as described in the check procedure. If does not meet spec.(1), perform the adjustment procedures (3) to (6). After adjustment, remove the shorting clip from TP509.
- (8) Perform check procedures (6) to (9).
- (9) If does not meet the spec.(2), perform the steps (3) to (7).
- (10) Insert a KCA-60 tape wound to the tape beginning portion and put the unit into the SEARCH X 10 mode. Check that H Difference is within the specification (3).
- (11) After adjustment, reset the TBC switch, INT TBC switch and S201, S202 on the SV-88C Board.

8-9. VIDEO HEAD DIHEDRAL ADJUSTMENT

- When a TBC Board is installed in the unit, remove it so that the video signal may be output without the TBC Board.

Tool: Dihedral adjustment screwdriver
Alignment tape, RR5-1SD
Monitor TV

Preparation:

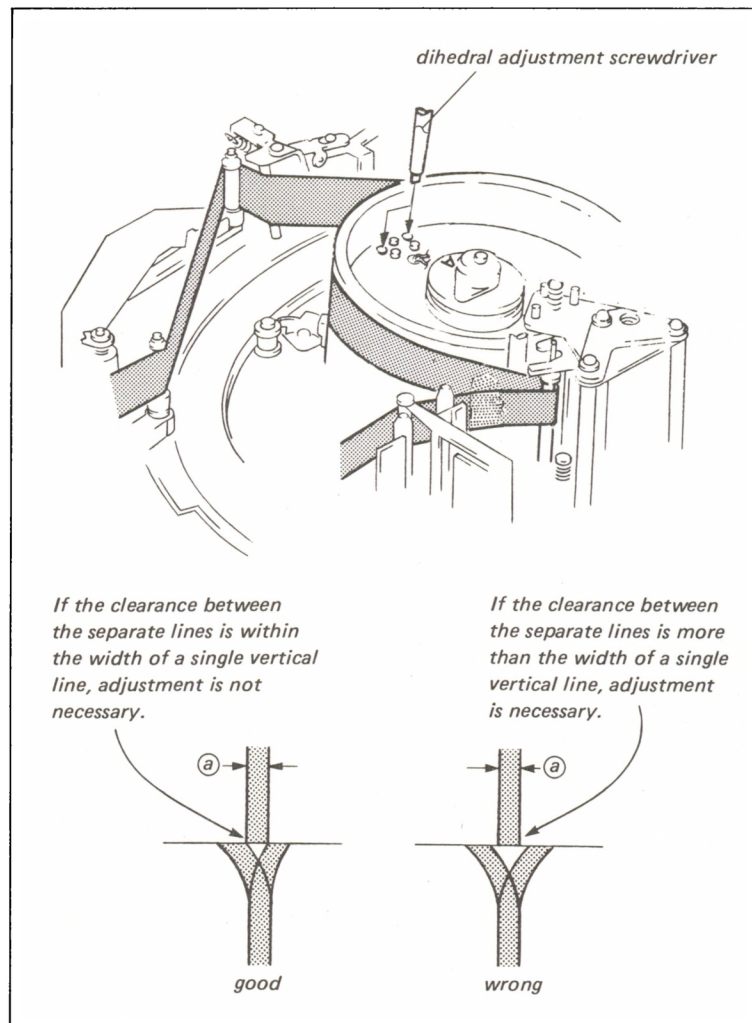
- Connect the video monitor TV to the VIDEO OUT connector on the connector panel.
- Playback the monoscope signal portion of the alignment tape.

Check procedure

- Check the distortion of the monoscope signal under the switching pulse. If the clearance between the separate lines is within the width of a single vertical line, adjustment is not necessary. If the clearance of the separate lines is more than the width of a vertical line, then adjustment is necessary.

Adjustment procedure:

- Press the STOP button and then press the STANDBY button. The rotation of the drum is stopped.
- Insert an eccentric screwdriver into the adjustment hole which is near "A" on the printed circuit board at the center of the drum, and perform the dihedral adjustment.
- Press the PLAY button.
- If the distortion has become worse, insert an eccentric screwdriver in the other adjustment hole and perform the dihedral adjustment.



SECTION 9

POWER SUPPLY/SYSTEM CONTROL ALIGNMENT

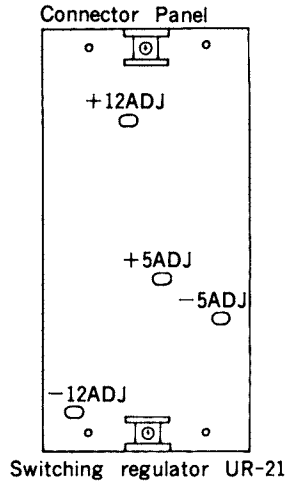
[Equipment Required]

- DC Voltmeter.

9-1. DC VOLTAGE REGULATOR (UR-21) ADJUSTMENT

Load for adjustment

- +12V : CN251-5,6/UR-21, 2.4Ω 80W
- 12V : CN251-7/UR-21, 6.2Ω 30W
- +5V : CN201-1,2/UR-21, 1.2Ω 30W
- 5V : CN201-7/UR-21, 2Ω 15W



machine conditions for adjustment	spec.	adjustment
• Remove the power panel on the connector panel. • Remove the switching regulator connectors (CN430, 431 and 432) from the main unit. • Attach the load. • Connect the AC connector and turn on the power. • Using an alignment tool, adjust the voltage from the outside of the switching regulator's outer cabinet. (NOTE) After the voltage is stabilized, adjust quickly in short time. • After the adjustment is completed, install the switching regulator and power panel.	• +12V adjustment $+12.1 \pm 0.1 \text{Vdc}$	switching regulator ⒶRV51/UR-21-C2
	• -12V adjustment $-12.1 \pm 0.1 \text{Vdc}$	switching regulator ⒶRV251/UR-21-M2
	• +5V adjustment $+5.1 \pm 0.1 \text{Vdc}$	switching regulator ⒶRV51/UR-21-C1
	• -5V adjustment $-5.1 \pm 0.1 \text{Vdc}$	switching regulator ⒶRV201/UR-21-M1

9-2. TAPE SENSOR BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• POWER sw : OFF • Short between TP4/SY-102B(A-5) and GND with a shorting clip. • POWER sw : ON • After the adjustment is completed, remove the shorting clip. • DC Voltmeter	TP3/SY-102B(A-5) $6.0 \pm 0.2 \text{Vdc}$	RV1/SY-102B(A-4)

SECTION 10

SERVO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope.
- Frequency Counter.
- DC Voltmeter.
- Cassette tape: KCA-60 or KSP-60
- Alignment Tape: RR5-1SD (Parts No. 8-960-037-80) —SP tape—

TIME	VIDEO	AUDIO	TIME CODE
5	color bars	————	——
3	Gated sweep (B/W)	1kHz, 0dB	——
3	Gated sweep (color)	10kHz, -10dB	——
3	Pulse & bar (color) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: OFF) 40Hz, -20dB (NR: OFF) 7kHz, -20dB (NR: OFF) 10kHz, -20dB (NR: OFF) 15kHz, -20dB (NR: OFF)	——
2	Pulse & bar (B/W) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: ON) 15 kHz, -20dB (NR: ON)	——
2	Monoscope (color)	————	——
2	Pseudo color bars	————	TIME CODE

- For the reel servo adjustment, refer to Section 6 Link and Drive System Alignment and Section 7 Torque System Alignment.

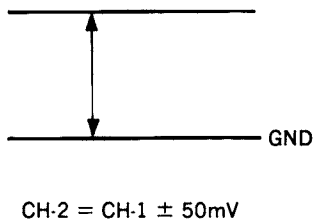
RV601/SV-88C (0-5) 6-3-2 Supply Tension Detector Sensitivity Adjustment
RV602/SV-88C (P-5) 6-4-3 Take-up Tension Detector Sensitivity Adjustment
RV1/DR-53 7-4-1. S Reel Motor Current Sensitive Adjustment
RV2/DR-53 7-4-2. T Reel Motor Current Sensitive Adjustment

- For the switching position adjustment and drum lock phase and drum AFC check, refer to Section 8 Tape Run Alignment.

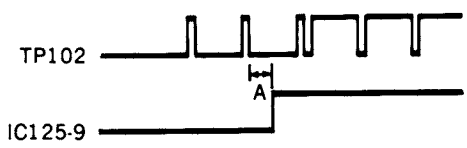
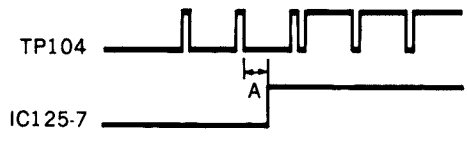
RV103/SV-88C(D-1) } 8-9-8. Switching Position Adjustment
RV104/SV-88C(E-1) }

- Extend by using the EX-128 Extension Board to adjust the SV-88C board.
- REF VIDEO IN connector: Color-bar

10-1. D/A AMPLITUDE ADJUSTMENT

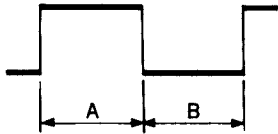
machine conditions for adjustment	spec.	adjustment
- Fully turn RV402/SV-88C(G-3) counterclockwise (when viewed from the component side). - S201/SV-88C(K-1): Nos.5 and 6 ON - S202/SV-88C(M-1): ON - EJECT mode - After the adjustment is completed, return S201 and S202 to the former positions.	CH-1: TP403/SV-88C(Q-5) CH-2: TP405/SV-88C(I-5)  $CH-2 = CH-1 \pm 50mV$	●RV402/SV-88C(G-3)

10-2. VERTICAL SEP EN PULSE ADJUSTMENT

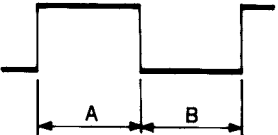
machine conditions for adjustment	spec.	adjustment
EJECT mode	Step 1 CH-1: TP102/SV-88C(C-3) CH-2: IC125-⑨ pin/SV-88C(E-3)  $A = 14 \pm 1 \mu s$ TRIG: CH-1(V Sync)	●RV101/SV-88C(E-3)
	Step 2 CH-1: TP104/SV-88C(D-6) CH-2: IC125-⑦ pin/SV-88C(E-3)  $A = 14 \pm 1 \mu s$ TRIG: CH-1(V Sync)	●RV102/SV-88C(E-4)

10-3. CAPSTAN FG BIAS ADJUSTMENT

Step 1. (FG-A)

machine conditions for adjustment	spec.	adjustment
• PB mode	TP501/SV-88C(L-6)  $DUTY = 50 \pm 2\% = (A = B \pm 2\%)$	●RV502/SV-88C(L-7)

Step 2. (FG-B)

machine conditions for adjustment	spec.	adjustment
• PB mode	TP502/SV-88C(M-6)  $DUTY = 50 \pm 2\% = (A = B \pm 2\%)$	●RV503/SV-88C(L-6)

10-4. DRUM FREE SPEED ADJUSTMENT

Step 1.

machine conditions for adjustment	spec.	adjustment
• Short between TP509/SV-88C(E-6) and GND with a shorting clip. • Insert the alignment tape RR5-1SD. • SEARCH • STILL mode • Measure the voltage at TP505 and TP512 using a dc voltmeter. • INT TBC sw: BYPASS • EXT TBC sw: OFF • After the adjustment is completed, remove the shorting clip.	TP505/SV-88C(I-6) TP512/SV-88C(H-6) $(TP505) = (TP512) \pm 10mV$ ※The voltage at TP505 and TP512 should be $2.5 \pm 0.15Vdc$ relative to ground.	⚙ RV507/SV-88C(H-6)

Step 2.

machine conditions for adjustment	spec.	adjustment
• Short between TP509/SV-88C(E-6) and GND with a shorting clip. • Insert the alignment tape RR5-1SD. • S201/SV-88C(K-1): No.2 ON • Repeat the mode from STILL to PLAY and vice versa. • INT TBC sw: BYPASS • EXT TBC sw: OFF • After the adjustment is completed, return S201 to the former position and remove the shorting clip.	TP505/SV-88C(I-6) The voltage difference in the STILL and PLAY modes should be within $\pm 50mV$.	⚙ RV506/SV-88C(H-5)

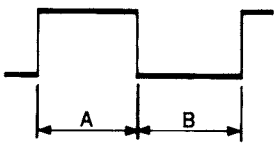
10-5. TRACKING CONTROL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Set the TRACKING control on the front panel to the center click position. - STOP mode - Connect a dc voltmeter between TP407/SV-88C(Q-6)(+) and GND(-).	Between TP407/SV-88C(Q-6) and GND $2.5 \pm 0.1 \text{Vdc}$	RV404/SV-88C(Q-8)

10-6. SKEW CONTROL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Set the SKEW control on the Front Panel to the center click position. - STOP mode - Connect a dc voltmeter between TP408/SV-88C(Q-6)(+) and GND(-).	Between TP408/SV-88C(Q-6) and GND $2.5 \pm 0.1 \text{Vdc}$	RV403/SV-88C(Q-7)

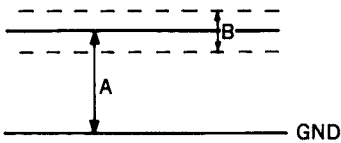
10-7. REEL FG BIAS ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- S201/SV-88C(K-1): No.7 ON - S202/SV-88C(M-1): ON - STOP mode - After the adjustment is completed, return S201 and S202 to the former positions.	Take-up reel(A): TP607/SV-88C(0-6) Take-up reel(B): TP608/SV-88C(0-6) Supply reel(A): TP609/SV-88C(0-6) Supply reel(B): TP610/SV-88C(0-5)  $\text{DUTY} = 50 \pm 2\% = (A = B \pm 2\%)$	RV3/SE-48: Take-up reel(A) RV4/SE-48: Take-up reel(B) RV2/SE-48: Supply reel(A) RV1/SE-48: Supply reel(B)

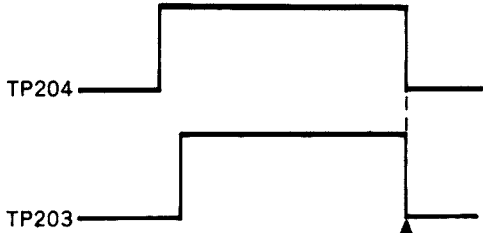
10-8. CAPSTAN FREE SPEED ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Insert the alignment tape RR5-1SD. • STILL mode PLAY mode • Oscilloscope • INT TBC sw: BYPASS • EXT TBC sw: OFF	TP505/SV-88C(I-6)SEARCH • STILL mode TP503/SV-88C(G-7)PLAY mode The voltage difference in the STILL and PLAY modes should be $0 \pm 100\text{mV}$	⚙️RV501/SV-88C(F-5)

10-9. CAPSTAN ACCELERATION COMPENSATION ADJUSTMENT

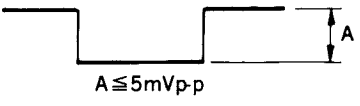
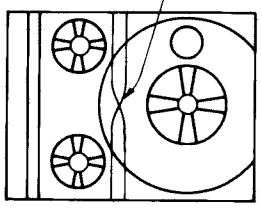
machine conditions for adjustment	spec.	adjustment
• Insert the cassette tape KCA-60 or KSP-60 (at the tape center). • Alternately repeat the SEARCH FWD mode at five times and two times normal speed.	TP602/SV-88C(0-4)  $A \approx 2.5\text{Vdc}(\text{reference})$ $B = A \pm 0.25\text{Vdc}$	⚙️RV603/SV-88C(E-5)

10-10. TRACKING CONTROL CENTER ADJUSTMENT

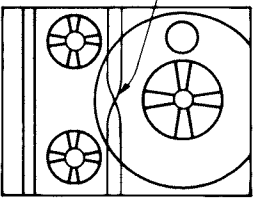
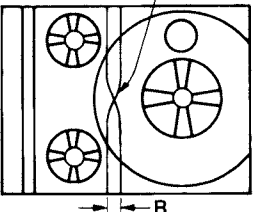
machine conditions for adjustment	spec.	adjustment
• Set the TRACKING control on the Front Panel to the center click position. • Play back the color bars signal portion of the alignment tape RR5-1SD.	CH-1: TP204/SV-88C(0-1) CH-2: TP203/SV-88C(I-1)  Adjust the trailing edge (Within $\pm 30\mu\text{sec}$). * Adjust at the jitter center. TRIG: CH-1	⚙️RV404/SV-88C(Q-8)

10-11. PICTURE SPLITTING COMPENSATOR ADJUSTMENT

Step 1.

machine conditions for adjustment	spec.	adjustment
• Play back the monoscope signal portion of alignment tape RR5-1SD.	TP507/SV-88C(H-5)  Monitor  cross point Check the cross point of the vertical line.	RV505/SV-88C(H-5)

Step 2.

machine conditions for adjustment	spec.	adjustment
• Play back the monoscope signal portion of alignment tape RR5-1SD.	Monitor  cross point 1. Extend the picture splitting by turning RV505/SV-88C(H-5) temporarily. 2. Set the cross point of the vertical line to the position checked in the STEP 1.	RV504/SV-88C(H-5)
	Monitor  cross point Minimize B	RV505/SV-88C(H-5)

• If the specification is not satisfied, readjust Step 1 and 2.

SECTION 11

AUDIO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope.
- Audio Oscillator.
- AC Voltmeter.
- Audio Attenuator.
- Alignment Tape: RR5-1SD (part No. 8-960-037-80)—SP tape—

TIME	VIDEO	AUDIO	TIME CODE
5	color bars	————	——
3	Gated sweep (B/W)	1kHz, 0dB	——
3	Gated sweep (color)	10kHz, -10dB	——
3	Pulse & bar (color) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: OFF) 40Hz, -20dB (NR: OFF) 7kHz, -20dB (NR: OFF) 10kHz, -20dB (NR: OFF) 15kHz, -20dB (NR: OFF)	——
2	Pulse & bar (B/W) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: ON) 15 kHz, -20dB (NR: ON)	——
2	Monoscope (color)	————	——
2	Pseudo color bars	————	TIME CODE

[Switch/VR Setting]

Front Panel

- AUDIO LEVEL CH-1(PB)VRCounterclockwise
- AUDIO LEVEL CH-2(PB)VRCounterclockwise
- HEADPHONE LEVEL VRCounterclockwise
- AUDIO MONITOR swMIX
- TRACKING VRFIXED
- REMOTE/LOCAL SELECT swLOCAL
- SKEWCLICK position

Do not move these switches and volumes unless otherwise specified.

11-1. AUDIO LEVEL SETTING

machine conditions for adjustment	spec.	adjustment
Play back the audio 1kHz 0dB segment of alignment tape.	CH-1: TP3/AP-23(B-5) CH-2: TP103/AP-23(E-5) $- 10 \pm 0.2\text{dBs}$	CH-1: ⌚RV4/AP-23(B-4) CH-2: ⌚RV104/AP-23(D-4)
	CH-1: TP7/AP-23(B-7) CH-2: TP107/AP-23(E-7) $+ 2 \pm 0.2\text{dBs}$	⌚PB LEVEL VR (Front panel)

NOTE: The AUDIO PB LEVEL control should not be touch until rest of Sec.11 Audio System Alignment completed.

11-2. AUDIO OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Play back the audio 1kHz 0dB segment of alignment tape. - PB mode	CH-1: AUDIO OUT connector CH-2: AUDIO OUT connector (terminated by 600Ω) $+ 4 \pm 0.5\text{dBm}$ (CH-1 level = CH-2 level)	CH-1: ⌚RV1/AU-87A(E-2) CH-2: ⌚RV2/AU-87A(D-2)

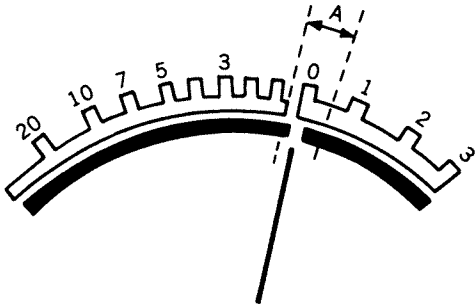
11-3. AUDIO MONITOR OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Play back the audio 1kHz 0dB segment of alignment tape. - PB mode - AUDIO MONITOR sw: CH-1	AUDIO OUT connector (terminated by 600Ω) $+ 4 \pm 0.5\text{dBm}$	⌚RV3/AU-87A(D-2)

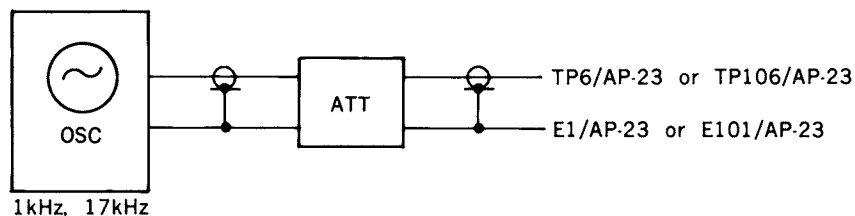
11-4. FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Extend the AP-23 Board by using the EX-127 Extension Board. • Play back the audio 1kHz, 7kHz, and 15kHz segments of alignment tape.	AUDIO OUT connector (terminated by 600Ω) 1kHz Level = Ref. Level 7kHz Level = (Ref. Level) ± 0.2dB 15kHz Level = (Ref. Level) ± 0.7dB Repeat the sequence of checks and adjustment at 1kHz, 7kHz and 15kHz until specifications are satisfied at a same time.	7kHz CH-1 : ⚙ RV2/AP-23(B-1) CH-2 : ⚙ RV102/AP-23(D-1) 15kHz CH-1 : ⚙ RV1/AP-23(B-1) CH-2 : ⚙ RV101/AP-23(D-1) CH-1 : ⚙ RV3/AP-23(A-4) CH-2 : ⚙ RV103/AP-23(D-4)

11-5. AUDIO LEVEL METER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the audio 1kHz 0dB segment of alignment tape. • PB mode	AUDIO LEVEL meter  $A = 0 \pm 0.5\text{dB}$	CH-1 : ⚙ RV5/AP-23(C-6) CH-2 : ⚙ RV105/AP-23(F-6)

11-6. SPECTRAL SKEWING ADJUSTMENT

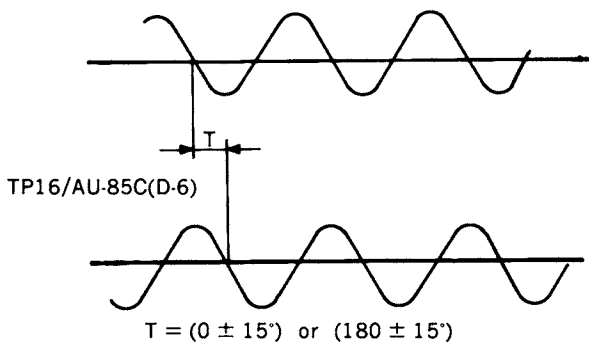


machine conditions for adjustment	spec.	adjustment
• Extend the AP-23 Board by using the EX-127 Extension Board. • Connect the OSC and ATT. • Short between TP4/AP-23(B-5) and TP5/AP-23(B-6) : and TP104/AP-23 (E-5) and TP105/AP-23(E-6) with shorting clips. • Short between TP19/AU-85C(F-5) and GND with a shorting clip. • Before Adjustment, set the level at TP3/AP-23(C-5) and TP103/AP-23(E-5) by ATT to 1kHz, $-10 \pm 0.1\text{dBs}$. • After the adjustment is completed, remove the shorting clips.	CH-1: TP3/AP-23(C-5) CH-2: TP103/AP-23(E-5) 1kHz = $-10 \pm 0.1\text{dBs}$ 17kHz = $-18.3 \pm 0.1\text{dBs}$	CH-1: ⚙ LV2/AP-23(B-5) CH-2: ⚙ LV102/AP-23(E-5)

11-7. PILOT TONE LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Extend the AU-85C Board by using the EX-127 Extension Board. • Play back the pulse & bar(B/W) segment of alignment tape.	CH-1: TP15/AU-85C(E-6) CH-2: TP16/AU-85C(D-6)  $A = 0.5 \begin{smallmatrix} +0.1 \\ -0 \end{smallmatrix} V_{p-p}$	CH-1: ⚙ RV3/AU-85C(E-6) CH-2: ⚙ RV6/AU-85C(D-6)

11-8. PILOT TONE PHASE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Extend the AU-85C Board by using the EX-127 Extension Board. - Play back the pulse & bar(B/W) segment of alignment tape.	TP28/AU-85C(C-5)  TP16/AU-85C(D-6) $T = (0 \pm 15^\circ) \text{ or } (180 \pm 15^\circ)$ TRIG: TP28/AU-85C(C-5)	RV2/AU-85C(G-5)

11-9. PILOT TONE DETECT DC BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Extend the AU-85C Board by using the EX-127 Extension Board. - STOP mode	CH-1: DC Level at TP17/AU-85C = (DC Level at TP18/AU-85C) $\pm$ 50mV CH-2: DC Level at TP20/AU-85C = (DC Level at TP21/AU-85C) $\pm$ 50mV	CH-1: RV4/AU-85C(E-4) CH-2: RV7/AU-85C(C-4)

11-10. DOLBY DETECT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Extend the AU-85C Board by using the EX-127 Extension Board. - STOP mode	TP19/AU-85C(F-5) $+ 4 \pm 0.05 \text{ Vdc}$	RV5/AU-85C(F-4)

11-11. DOLBY DETECT INHIBIT ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the pulse & bar (B/W) segment of the alignment tape RR5-ISD. • PB mode	CH-1 : TP25/AU-85C(B-4) CH-2 : TP27/AU-85C(B-4) $+4.5 \pm 0.2 \text{Vdc}$	● CH-1 : RV10/AU-85C(A-5) ● CH-2 : RV11/AU-85C(C-4)

SECTION 12

VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope.
- Vector Scope.
- DC voltmeter.
- Frequency counter.
- Video sweep signal generator.
- Spectrum analyzer.
- Cassette Tape: KCA, KCS and KSP.
- Alignment Tape: RR5-1SD (part No. 8-960-037-80)—SP tape—

TIME	VIDEO	AUDIO	TIME CODE
5	color bars	_____	_____
3	Gated sweep (B/W)	1 kHz, 0dB	_____
3	Gated sweep (color)	10kHz, -10dB	_____
3	Pulse & bar (color) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: OFF) 40Hz, -20dB (NR: OFF) 7kHz, -20dB (NR: OFF) 10kHz, -20dB (NR: OFF) 15kHz, -20dB (NR: OFF)	_____
2	Pulse & bar (B/W) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: ON) 15 kHz, -20dB (NR: ON)	_____
2	Monoscope (color)	_____	_____
2	Pseudo color bars	_____	TIME CODE

RR5-4SB (part No. 8-960-015-16)—conventional tape—

TIME	VIDEO	AUDIO	TIME CODE
5	color bars	3kHz, 0dB	1kHz
5	R-F sweep	_____	_____
5	Monoscope	_____	_____
2.5	Modulated 20T pulse	1kHz, 0dB	_____
2.5	R-F 8MHz	10kHz, -10dB	_____

[Switch Setting]

Connector Panel

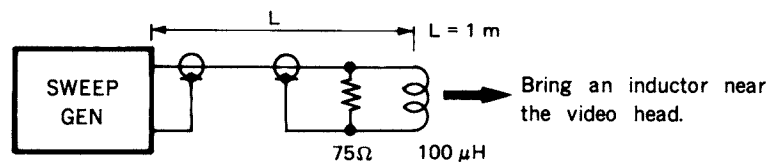
- REF VIDEO IN 75Ω swON
- EXT TBC swOFF

Do not move these switches and volumes unless otherwise specified.

- Extend by using the EX-128 Extension Board to adjust the DM-54A board.
- Extend by using the EX-127 Extension Board to adjust the BC-11A boards.

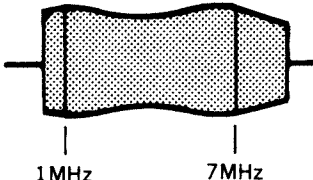
12-1. RF FREQUENCY RESPONSE ADJUSTMENT (1)

To make this adjustment, the head drum rotation is stopped without a cassette tape, and the sweep signal is L-coupled to the video head using an inductor (approximately $100\mu\text{H}$).



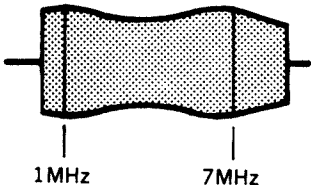
Sweep signal band width: 1 to 10MHz

Step 1. CH-A RF frequency response adjustment

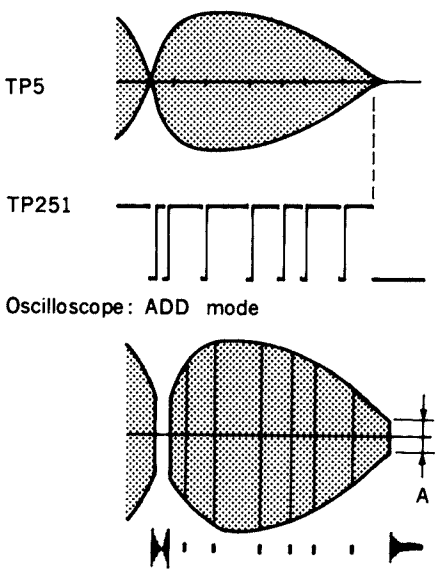
machine conditions for adjustment	spec.	adjustment				
• Short between CN104-10B/DM-54A (D-7) and GND with shorting clips. • Adjust the sweep signal generator output so that the signal level in 250mVp-p. • Couple a sweep signal to the video head (CH-A). • Adjust the coupling so that the amplitude is maximized. • After the adjustment is completed, remove the shorting clips.	TP101/PD-45 <table><tr><td>1MHz</td><td>7MHz</td></tr><tr><td>100% (reference)</td><td>100%</td></tr></table>	1MHz	7MHz	100% (reference)	100%	RV101/PD-45
1MHz	7MHz					
100% (reference)	100%					

TRIG : Trigger output/sweep generator

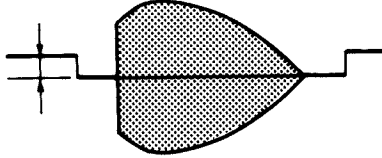
Step 2. CH-B RF frequency response adjustment

machine conditions for adjustment	spec.	adjustment				
• Short between CN104-10B/DM-54A (D-7) and GND with shorting clips. • Adjust the sweep signal generator output so that the signal level is 250 mVp-p. • Couple a sweep signal to the video head (CH-B). • Adjust the coupling so that the amplitude is maximized. • After the adjustment is completed, remove the shorting clips.	TP102/PD-45 <table><tr><td>1MHz</td><td>7MHz</td></tr><tr><td>100 % (reference)</td><td>100 %</td></tr></table>	1MHz	7MHz	100 % (reference)	100 %	RV102/PD-45
1MHz	7MHz					
100 % (reference)	100 %					

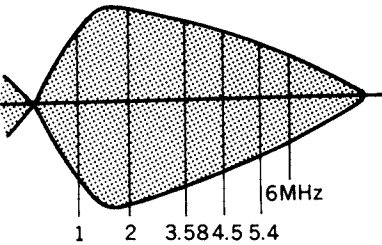
12-2. DROPOUT COMPENSATION SENSITIVITY ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the RF sweep segment of the alignment tape RR5-4SB.	CH-1 : TP5/DM-54A(T-4) CH-2 ; TP251/DM-54A(P-4)  Oscilloscope: ADD mode A = 35 ± 5 mV TRIG: TP4/DM-54A(R-5)	RV251/DM-54A(S-4)

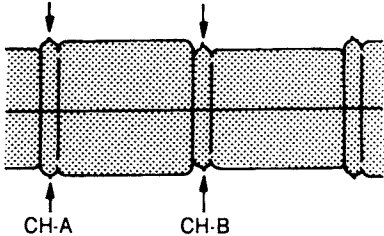
12-3. RF AMPLIFIER DC BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the RF sweep segment of the alignment tape RR5-4SB. • Fully turn RV1/DM-54A(R-7) counterclockwise. • S201/SV-88C(K-1): No.8 ON S202/SV-88C(M-1): ON • After the adjustment is completed, return S201 and S202 to the former positions.	TP17/DM-54A(S-6)  Equalize the dc level in both channels. TRIG: TP4/DM-54A(R-5)	●RV1/DM-54A(R-7)

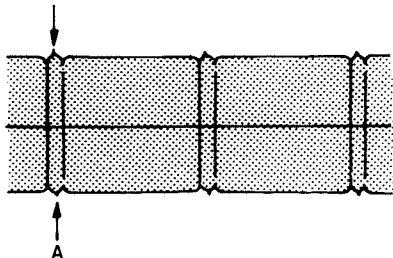
12-4. RF FREQUENCY RESPONSE ADJUSTMENT (2)

machine conditions for adjustment	spec.	adjustment										
• Play back the RF sweep segment of the alignment tape RR5-4SB. • Maximize the RF level at TP3/DM-54A(S-7) using a TRACKING control. • S201/SV-88C(K-1): No.8 ON • After the adjustment is completed, return the TRACKING control to the center click position and S201 to the former position.	TP3/DM-54A(S-7)  <table><tr><td>2MHz</td><td>3.58MHz</td><td>4.5MHz</td><td>5.4MHz</td><td>6MHz</td></tr><tr><td>100% (reference)</td><td>80 ±10%</td><td>75 ±10%</td><td>60 ±5%</td><td>55 ±10%</td></tr></table> TRIG : TP4/DM-54A(R-5)	2MHz	3.58MHz	4.5MHz	5.4MHz	6MHz	100% (reference)	80 ±10%	75 ±10%	60 ±5%	55 ±10%	CH-A ; ●RV3/DM-54A(S-7) CH-B ; ●RV2/DM-54A(S-7)
2MHz	3.58MHz	4.5MHz	5.4MHz	6MHz								
100% (reference)	80 ±10%	75 ±10%	60 ±5%	55 ±10%								

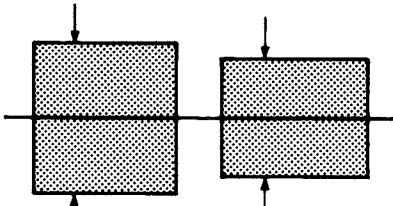
12-5. Y RF OUTPUT BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Maximize the RF level at TP5/DM-54A(T-4) using a TRACKING control. • After the adjustment is completed, return the TRACKING control to the center click position.	TP5/DM-54A(T-4)  CH-A CH-B Sync tip level in CH-A = Sync tip level in CH-B(±5%) TRIG: TP4/DM-54A(R-5)	RV6/DM-54A(S-6)

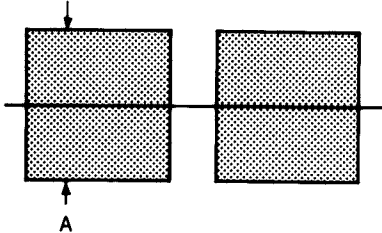
12-6. Y RF OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Maximize the RF level at TP5/DM-54A(T-4) using a TRACKING control. • After the adjustment is completed, return the TRACKING control to the center click position.	TP5/DM-54A(T-4)  A $A = 0.35 \pm 0.04 \text{ V}$ TRIG : TP4/DM-54A(R-5)	RV5/DM-54A(R-7)

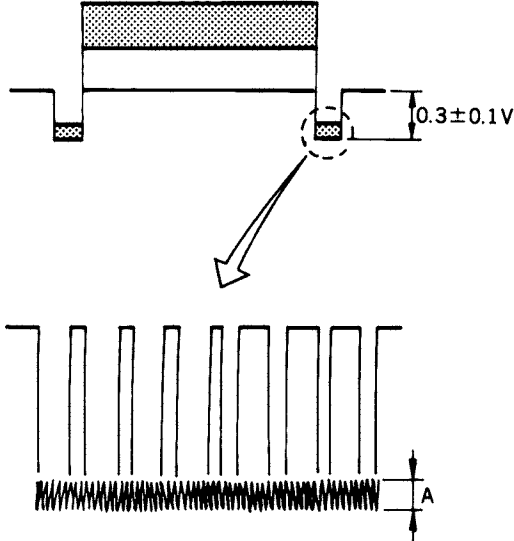
12-7. CHROMA RF BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Maximize the RF level at TP501/DM-54A(J-5) using a TRACKING control. • After the adjustment is completed, return the TRACKING control to the center click position.	TP501/DM-54A(L-7)  CH-A CH-B CH-A level=CH-B level TRIG : TP4/DM-54A(R-5)	RV4/DM-54A(S-6)

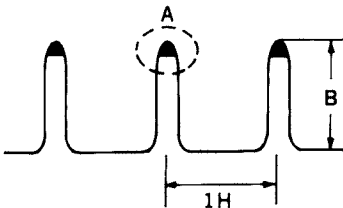
12-8. CHROMA RF LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-ISD. • Maximize the RF level at TP501/DM-54A(J-5) using a TRACKING control. • After the adjustment is completed, return the TRACKING control to the center click position.	TP501/DM-54A(J-5)  $A = 0.2 \pm 0.01 V_{p-p}$ TRIG : TP509/DM-54A(F-1)	RV501/DM-54A(L-6)

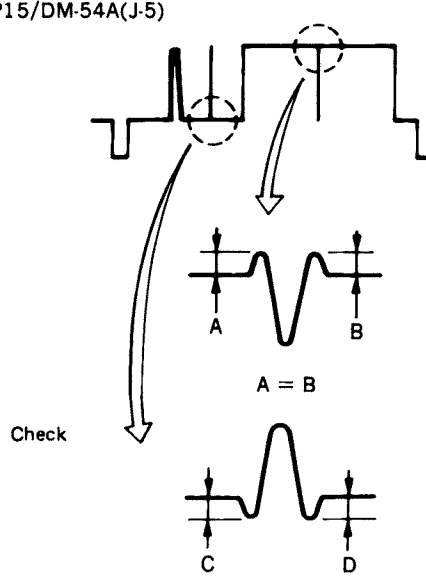
12-9. CARRIER BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-4SB.	TP14/DM-54A(M-3)  $0.3 \pm 0.1 V$ $A \leq 0.1 V$ (Make flattest) TRIG : TP4/DM-54A(R-5)	RV8/DM-54A(S-4)

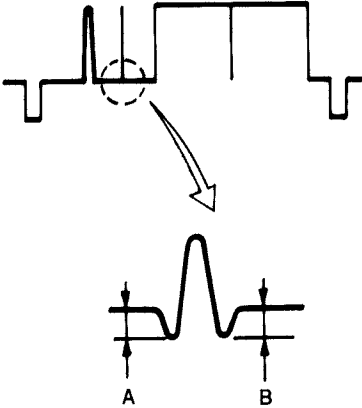
12-10. SP MODE DETECTION ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-4SB.	TP301/DM-54A(M-5) Specification 1  Make flattest A portion Specification 2 $B = 2.3 \pm 0.5 \text{ V}_{p-p}$ TRIG : TP509/DM-54A(F-1)	● LV301/DM-54A(P-5) ● RV301/DM-54A(L-6)
• Play back the color-bar segment of the alignment tape RR5-1SD.	Confirm that the SP lamp on the Front panel lights.	

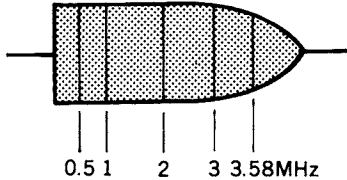
12-11. DEMODULATOR Y PHASE EQUALIZING ADJUSTMENT (SP MODE)

machine conditions for adjustment	spec.	adjustment
• Play back the pulse and bar (B/W) segment of the alignment tape RR5-1SD.	TP15/DM-54A(J-5)  Check $A = B$ $0 \leq C \leq D$ TRIG: TP504/DM-54A(C-7)	⊙ LV1/DM-54A(N-4)

12-12. PHASE EQUALIZING TENTATIVE ADJUSTMENT (CONVENTIONAL MODE)

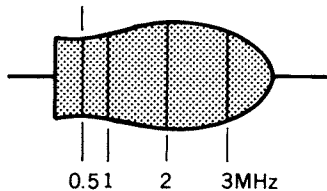
machine conditions for adjustment	spec.	adjustment
• Play back the MOD 20T signal on alignment tape RR5-4SB. • Fully turn RV12/DM-54A(M-2) counterclockwise.	TP15/DM-54A(J-5)  A = B TRIG: TP509/DM-54A(F-1)	● RV12/DM-54A(M-2)

12-13. DUB Y FREQUENCY RESPONSE ADJUSTMENT (SP MODE)

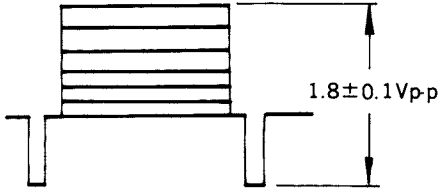
machine conditions for adjustment	spec.	adjustment															
• Play back the gated sweep (B/W) segment of the alignment tape RR5-1SD.	TP15/DM-54A(J-5)  <table><tr><th>0.5MHz</th><th>1MHz</th><th>2MHz</th><th>3MHz</th><th>3.58MHz</th></tr><tr><td>100%</td><td>100</td><td>100</td><td>95</td><td>80</td></tr><tr><td>(reference)</td><td>±5%</td><td>±10%</td><td>±5%</td><td>±10%</td></tr></table>	0.5MHz	1MHz	2MHz	3MHz	3.58MHz	100%	100	100	95	80	(reference)	±5%	±10%	±5%	±10%	● CV2/DM-54A (M-4)
0.5MHz	1MHz	2MHz	3MHz	3.58MHz													
100%	100	100	95	80													
(reference)	±5%	±10%	±5%	±10%													
	TRIG: TP4/DM-54A(R-5)																

NOTE: If the specification is not satisfied, adjust the level at 3MHz using RV2/DM-54A(R-7) and RV3/DM-54A(S-7), then, perform the sec.12-4. RF FREQUENCY RESPONSE ADJUSTMENT (2), perform the sec.12-5. Y RF OUTPUT BALANCE ADJUSTMENT and perform the sec.12-6. Y RF OUTPUT LEVEL ADJUSTMENT.

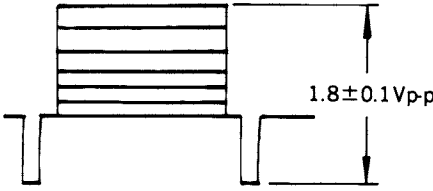
12-14. DUB Y FREQUENCY RESPONSE ADJUSTMENT (CONVENTIONAL MODE)

machine conditions for adjustment	spec.	adjustment								
• Prepare a KCA or KCS cassette tape. • Play back the gated sweep (color) segment normally recorded by BVU SP Editor.	TP15/DM-54A(J-5)  <table><tr><td>0.5MHz</td><td>1MHz</td><td>2MHz</td><td>3MHz</td></tr><tr><td>100% (reference)</td><td>103 ± 5%</td><td>106 ± 8%</td><td>90 ± 8%</td></tr></table> TRIG : TP4/DM-54A(R-5)	0.5MHz	1MHz	2MHz	3MHz	100% (reference)	103 ± 5%	106 ± 8%	90 ± 8%	● CV1/DM-54A(M-1)
0.5MHz	1MHz	2MHz	3MHz							
100% (reference)	103 ± 5%	106 ± 8%	90 ± 8%							

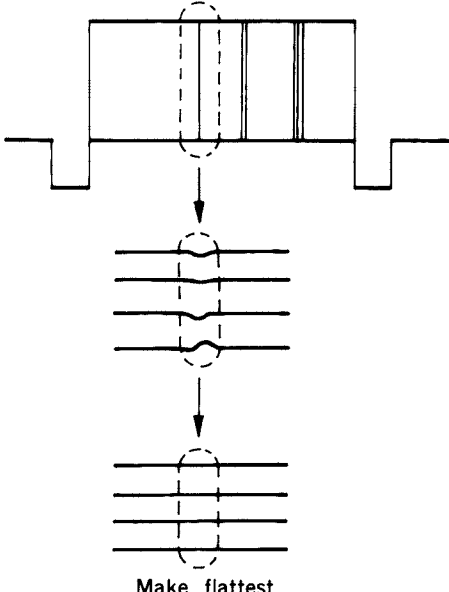
12-15. Y OUTPUT LEVEL ADJUSTMENT (SP MODE)

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP15/DM-54A(J-5)  NOTE: When noise appears at TP15/DM-54A(J-5), measure the level in the center of noise. TRIG: TP4/DM-54A(R-5)	● RV11/DM-54A(M-2)

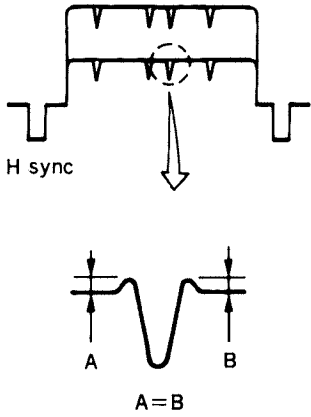
12-16. Y OUTPUT LEVEL ADJUSTMENT (CONVENTIONAL MODE)

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-4SB.	TP15/DM-54A(J-5)  NOTE: When noise appears at TP15/DM-54A(J-5), measure the level in the center of noise. TRIG: TP4/DM-54A(R-5)	● RV16/DM-54A(M-1)

12-17. DOC OFFSET/LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the pseudo color-bar segment of the alignment tape RR5-1SD.	TP15/DM-54A(J-5)  Make flattest TRIG: TP4/DM-54A(R-5)	Offset adj. ● RV13/DM-54A(K-3) Level adj. ● RV201/DM-54A(K-2)

12-18. PHASE EQUALIZING ADJUSTMENT (CONVENTIONAL MODE)

machine conditions for adjustment	spec.	adjustment
Play back the monoscope segment of the alignment tape RR5-4SB.	TP15/DM-54A(J-5)  H sync A=B	RV12/DM-54A(M-2)

12-19. SP/CONV DC SHIFT ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
DC voltmeter	TP8/DM-54A(P-1) 1.Press the SP detect switch, Voltage = A Vdc 2.Return the SP detect switch to the former position, Voltage B = $A \pm 0.01Vdc$	RV9/DM-54A(S-1)

12-20. SP/CONV DC BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
DC voltmeter	TP10/DM-54A(P-3) 1.Voltage = A Vdc 2.Press the SP detect switch, Voltage B = $A \pm 0.01Vdc$	RV10/DM-54A(S-3)

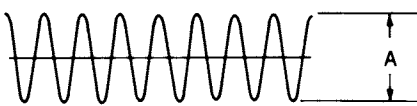
12-21. VCO DC LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • DC Voltmeter	TP514/DM-54A(G-2) $8.1 \pm 0.1 \text{ Vdc}$	⚙ RV505/DM-54A(G-1)

12-22. REFERENCE OSCILLATION ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP529/DM-54A(H-4) $3579.545 \pm 0.005 \text{ kHz}$	⚙ T501/DM-54A(H-3)

12-23. 4.27MHz LEVEL ADJUSTMENT

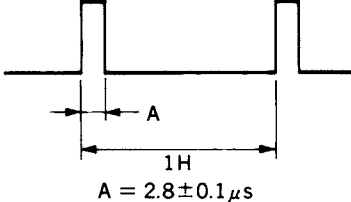
machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP513/DM-54A(G-2)  $A = 0.65 \pm 0.03 \text{ V}$	⚙ RV517/DM-54A(J-3)

12-24. ACC BURST GATE ADJUSTMENT

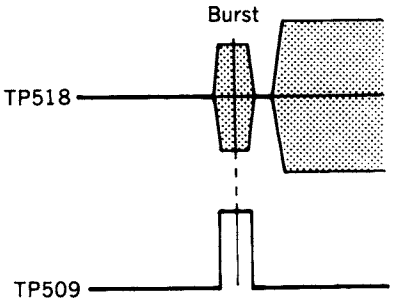
Step 1. Burst flag level adjustment

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP509/DM-54A(F-1)  $A = 4.2 \pm 0.1 \text{ V}$	⚙ RV511/DM-54A(E-1)

Step 2. Burst flag width adjustment

machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP509/DM-54A(F-1)  $A = 2.8 \pm 0.1 \mu s$	Ⓐ RV509/DM-54A(E-1)

Step 3. Burst flag phase adjustment

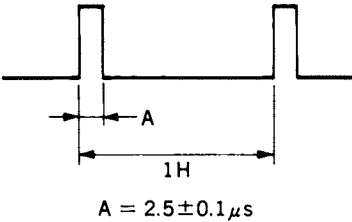
machine conditions for adjustment	spec.	adjustment
- Play back the color-bar segment of the alignment tape RR5-1SD. - Oscilloscope: ALT mode	CH-1: TP518/DM-54A(F-5) CH-2: TP509/DM-54A(F-1)  Align the center of both waveforms. TRIG: CH-2	Ⓐ RV508/DM-54A(E-1)

12-25. APC BURST GATE ADJUSTMENT

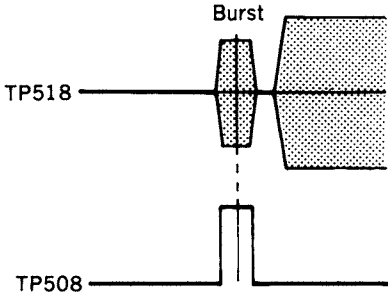
Step 1. Burst flag level adjustment

machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP508/DM-54A(F-1)  $A = 3.8 \pm 0.2 V$	Ⓐ RV510/DM-54A(E-1)

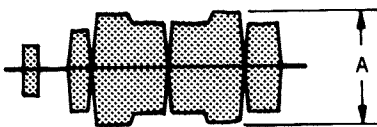
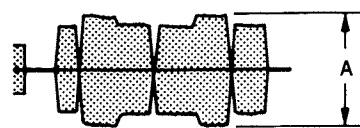
Step 2. Burst flag width adjustment

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP508/DM-54A(F-1)  $A = 2.5 \pm 0.1 \mu s$	● RV507/DM-54A(D-1)

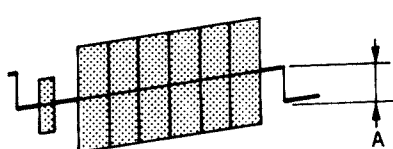
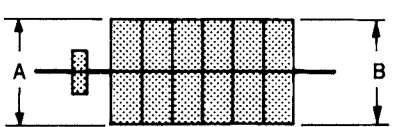
Step 3. Burst flag phase adjustment

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Oscilloscope: ALT mode	CH-1: TP518/DM-54A(F-5) CH-2: TP508/DM-54A(F-1)  Align the center of both waveforms. TRIG: CH-2	● RV506/DM-54A(D-1)

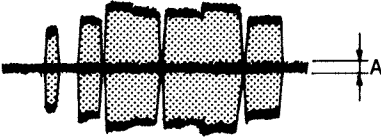
12-26. ACC LEVEL ADJUSTMENT (1)

machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP515/DM-54A(H-5)  $A = 0.8 \pm 0.04V$ TRIG: TP509/DM-54A(F-1)	● RV518/DM-54A(G-3)
	TP528/DM-54A(H-5)  $A = 0.8 \pm 0.04V$ TRIG: TP509/DM-54A(F-1)	● RV514/DM-54A(H-7)

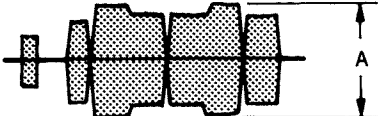
12-27. DG COMPENSATION TENTATIVE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP515/DM-54A(H-5)  Equalize the dc level ($A=0$). TRIG: TP509/DM-54A(F-1)	● RV516/DM-54A(G-6)
	TP515/DM-54A(H-5)  $A=B$ TRIG : TP509/DM-54A(F-1)	● RV513/DM-54A(H-7)

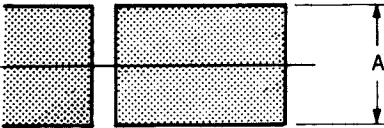
12-28. CONVERTER BALANCE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Wait for more than five minutes after power is turned on.	TP518/DM-54A(F-5)  $A \leq 35 \text{ mV}$ Minimize the carrier leak. TRIG: TP509/DM-54A(F-1)	RV519/DM-54A(H-6)

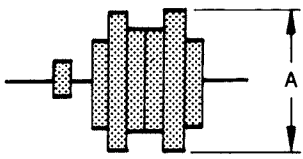
12-29. ACC LEVEL ADJUSTMENT (2)

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP515/DM-54A(H-5)  $A = 0.8 \pm 0.05 \text{ V}$ TRIG: TP509/DM-54A(F-1)	RV518/DM-54A(G-3)

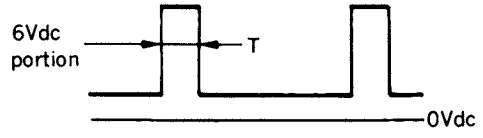
12-30. DUB CHROMA LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP504/DM-54A(C-7)  $A = 0.95 \pm 0.05 \text{ V}_{p-p}$ TRIG: TP509/DM-54A(F-1)	RV504/DM-54A(D-6)

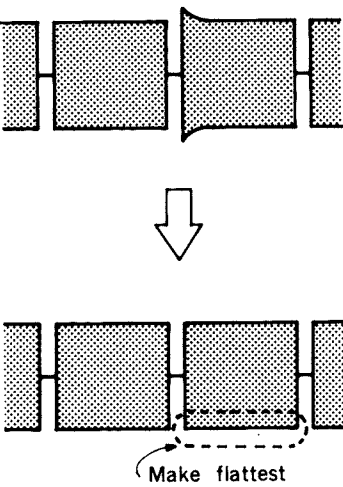
12-31. TBC CHROMA OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Insert the TBC-5 board into the unit.	TP525/DM-54A(D-2)  $A = 0.65 \pm 0.02V$ TRIG: TP509/DM-54A(F-1)	RV522/DM-54A(D-3)

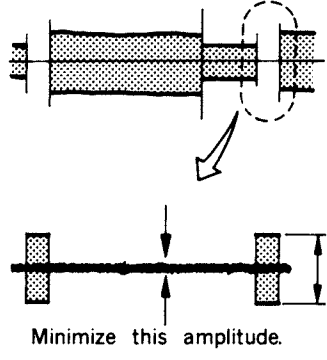
12-32. HIGH-SPEED ACC ADJUSTMENT (1)

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP521/DM-54A(E-4)  $T = 1.7 \pm 0.2\mu s$ TRIG: TP509/DM-54A(F-1)	RV520/DM-54A(C-5)

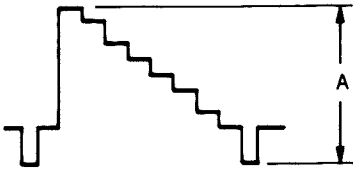
12-33. HIGH-SPEED ACC ADJUSTMENT (2)

machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP525/DM-54A(D-2)  TRIG: TP509/DM-54A(F-1)	● RV521/DM-54A(D-4)

12-34. CHROMA NOISE CANCELLER ADJUSTMENT

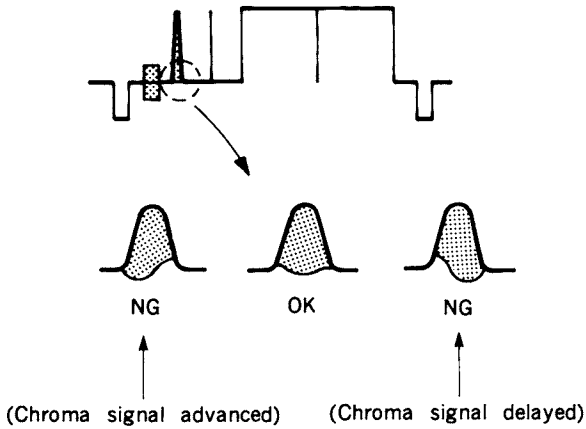
machine conditions for adjustment	spec.	adjustment
Play back the color-bar segment of the alignment tape RR5-1SD.	TP524/DM-54A(E-3)  TRIG: TP509/DM-54A(F-1)	● RV523/DM-54A(D-3)

12-35. TBC Y OUTPUT LEVEL ADJUSTMENT

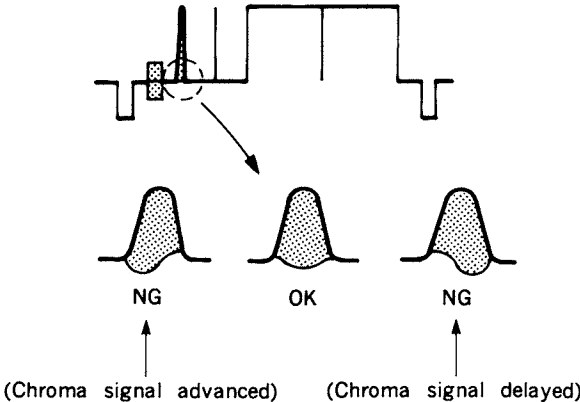
machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Insert the TBC-5 board into the unit.	TP16/DM-54A(D-2) GND: E502/DM-54A(D-2)  $A = 1.0 \pm 0.05V$ TRIG: TP4/DM-54A(R-5)	RV15/DM-54A(C-3)

NOTE : After the adjustment, perform the sec. 12-31. TBC CHROMA OUTPUT LEVEL ADJUSTMENT.

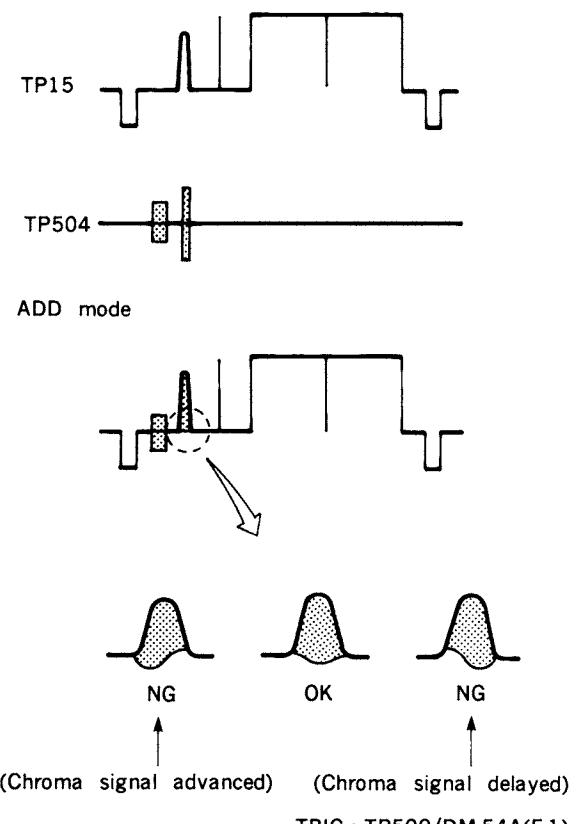
12-36. Y/C DELAY ADJUSTMENT (SP MODE)

machine conditions for adjustment	spec.	adjustment
• Play back the pulse and bar segment of the alignment tape RR5-1SD.	VIDEO OUT 1 connector (terminated by 75 ohms.) 	RV524/DM-54A(L-5) When the adjustment cannot be performed, adjust using internal taps of DL1/DM-54A(T-3) and DL2/DM-54A(S-3). (when the chroma signal is advanced, adjust the tap number to the higher figure).

12-37. Y/C DELAY ADJUSTMENT (CONVENTIONAL MODE)

machine conditions for adjustment	spec.	adjustment
Play back the MOD 20T segment of the alignment tape RR5-4SB.	VIDEO OUT 1 connector (terminated by 75 ohms.)  NG OK NG (Chroma signal advanced) (Chroma signal delayed)	RV502/DM-54A(K-5) When the adjustment cannot be performed, adjust using external taps of DL1/DM-54A(T-3) and DL2/DM-54A(S-3). (when the chroma signal is advanced, adjust the tap number to the higher figure).

12-38. Y/C DELAY DUB ADJUSTMENT (SP MODE)

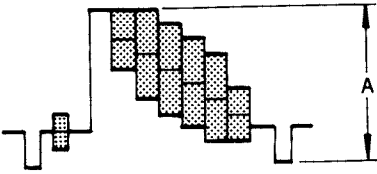
machine conditions for adjustment	spec.	adjustment
- Play back the pulse and bar segment of the alignment tape RR5-1SD. - Oscilloscope: ADD mode.	CH-1: TP15/DM-54A(J-5) CH-2: TP504/DM-54A(C-7) TP15  TP504 ADD mode NG OK NG (Chroma signal advanced) (Chroma signal delayed) TRIG : TP509/DM-54A(F-1)	DL506/DM-54A(E-6) (When the chroma signal is advanced, adjust the tap number to the higher figure and solder the tap number at one higher figure after the specification is met.) (ex; meet the specification: tap number two solder: tap number three)

12-39. DG COMPENSATION ADJUSTMENT

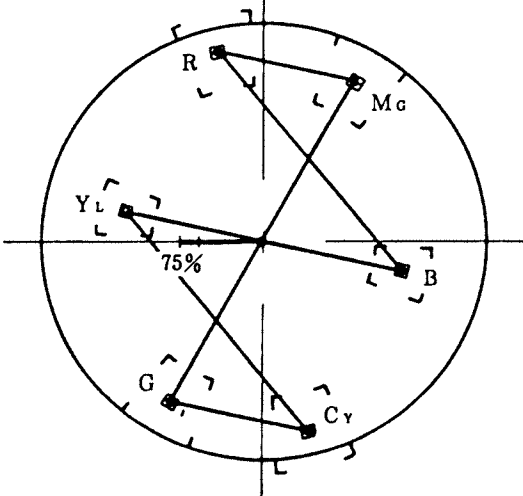
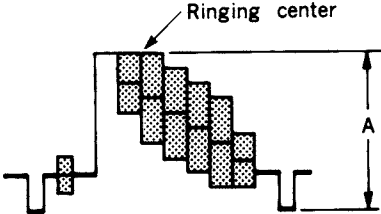
Step 1.

machine conditions for adjustment	spec.	adjustment
• Normally record the MOD 5 step segment on KCA (or KCS) and KSP tapes with a BVU SP Editor. • Adjust the vectorscope's GAIN control so that luminescent spots are on the circumference. CONV mode adj. • Insert a KCA or KCS cassette tape and play back the BVU SP Editor recorded portion. SP mode adj. • Insert a KSP cassette tape and play back the BVU SP Editor recorded portion.	TP515/DM-54A(H-5) Vectorscope (DG mode)  Make flat A DG $\leq 3\%$	CONV mode adj. ●RV513/DM-54A(H-7) SP mode adj. ●RV515/DM-54A(J-7)

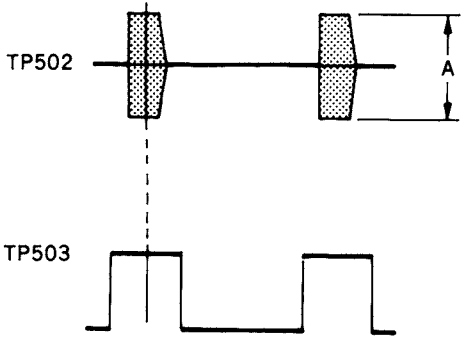
Step 2.

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	TP515/DM-54A(H-5)  A = 0.8Vp-p	●RV516/DM-54A(G-6)

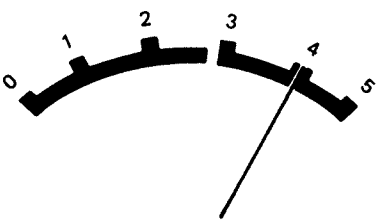
12-40. Y/C MIXING ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD.	VIDEO OUT 1 connector (terminated by 75 ohms.) Vectorscope  RED luminescent spots should be located in the center of mark .	●RV401/DM-54A(C-3)
	VIDEO OUT 1 connector (terminated by 75 ohms.)  $A = 1.0 \pm 0.05V_{p-p}$	●RV402/DM-54A(C-3)

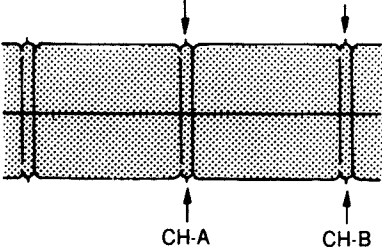
12-41. TIME CODE GATE PULSE LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
Play back the time code segment of the alignment tape RR5-1SD.	CH-1 : TP502/DM-54A(L-7) CH-2 : TP503/DM-54A(J-7)  $A = 2.3 \pm 0.2V_{p-p}$ TRIG : CN104-13A/DM-54A (D-7)	RV503/DM-54A(L-7)

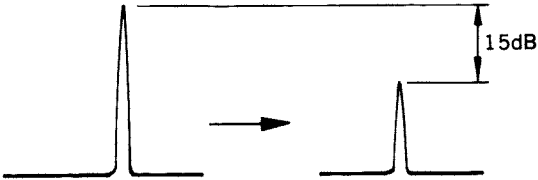
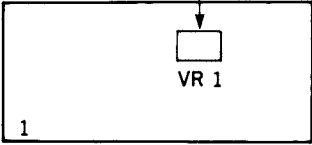
12-42. TRACKING METER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
- Play back the color-bar segment of the alignment tape RR5-4SB. - Set the TRACKING control to maximize position the meter. - Wait for more than five minutes after power is turned on.	Video/RF meter  Adjust the meter so that its pointer indicates scale 4.	RV4/VR-76

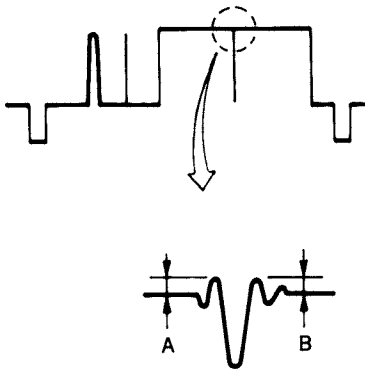
12-43. O.A Y RF OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Set the TRACKING control to maximize position the meter.	TP5/DM-54A(T-4)  Level adjustment: $0.35 \pm 0.05V_{p-p}$ Balance adjustment: $CH-A = CH-B \pm 10\%$ TRIG : TP4/DM-54A(R-5)	Level adj. ⚙ RV5/DM-54A(R-7) Balance adj. ⚙ RV6/DM-54A(S-6)

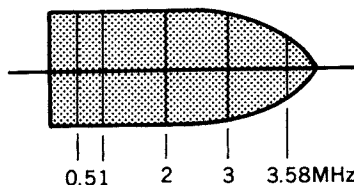
12-44. Y NOISE CANCELLER ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Desolder the bridge on SL1/DM-54A(B-1). • Put 3MHz, 20mV signal to TP19/DM-54A(B-1). • Record this level. • Short between TP20/DM-54A and GND with a shorting clip. • After the adjustment is completed, #remove the shorting clip and resolder the solder bridge.	TP16/DM-54A(D-2) Spectrum analyzer.  Lower the level by 15dB than recorded level.	⚙ VR1(IC12)/DM-54A(B-2) 

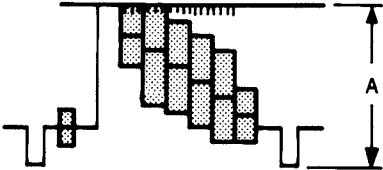
12-45. Y PHASE EQUALIZE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Short between TP501/DM-54A (J-5) and GND with a shorting clip. • Play back the pulse and bar (B/W) segment of the alignment tape RR5-1SD • After the adjustment is completed, remove the shorting clip.	VIDEO OUT 1 connector (terminated by 75 ohms)  A = B TRIG: TP509/DM-54A(F-1)	●RV14/DM-54A(B-1)

12-46. Y FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment										
• Short between TP501/DM-54A board (J-5) and GND with a shorting clip. • Play back the gated sweep (B/W) segment of the alignment tape RR5-1SD • After the adjustment is completed, remove the shorting clip.	VIDEO OUT 1 connector (terminated by 75 ohms)  <table><tr><td>0.5MHz</td><td>1MHz</td><td>2MHz</td><td>3MHz</td><td>3.58MHz</td></tr><tr><td>100% (reference)</td><td>100 ±5%</td><td>100 ±10%</td><td>90 ±5%</td><td>70 ±15%</td></tr></table>	0.5MHz	1MHz	2MHz	3MHz	3.58MHz	100% (reference)	100 ±5%	100 ±10%	90 ±5%	70 ±15%	● CV3/DM-54A(C-1)
0.5MHz	1MHz	2MHz	3MHz	3.58MHz								
100% (reference)	100 ±5%	100 ±10%	90 ±5%	70 ±15%								

12-47. CHARACTER MIX ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the color-bar segment of the alignment tape RR5-1SD. • Indicate the ITEM No.104, TITLE (LARGE) in the DIAL MENU operation on the monitor (Refer to Section 1-6.) • Select the ■ in the character menu area and set it one line in the title setup area. • Superimpose the title on the monitor.	TP404/DM-54A(B-6)  A: Adjust the character signal portion to the white level.	●RV403/DM-54A(B-4)

SECTION 13

TIME CODE SYSTEM ALIGNMENT AND OTHERS

[Equipment Required]

- Oscilloscope
- Alignment Tape: RR5-1SD (Part No. 8-960-037-80) -SP tape

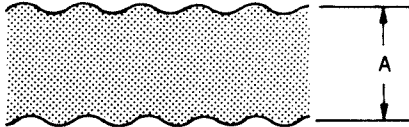
TIME	VIDEO	AUDIO	TIME CODE
5	color bars	—	—
3	Gated sweep (B/W)	1kHz, 0dB	—
3	Gated sweep (color)	10kHz, -10dB	—
3	Pulse & bar (color) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: OFF) 40Hz, -20dB (NR: OFF) 7kHz, -20dB (NR: OFF) 10kHz, -20dB (NR: OFF) 15kHz, -20dB (NR: OFF)	—
2	Pulse & bar (B/W) (MOD 12.5T and inverted 2T)	1kHz, -20dB (NR: ON) 15 kHz, -20dB (NR: ON)	—
2	Monoscope (color)	—	—
2	Pseudo color bars	—	TIME CODE

[Switch/VR Setting]

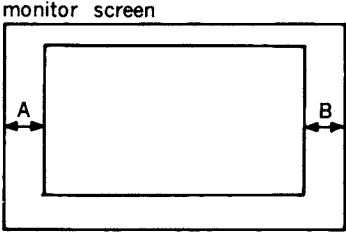
Subcontrol Panel

- EXT/INT SELECT swEXT
- SLAVE LOCK/PRESET SELECT sw.....PRESET

13-1. TC PB LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Play back the Time Code signal on alignment tape RR-5-1SD.	TP102/BC-11A(B-1) GND: E201/BC-11A(C-4)  $A = 1.4 \pm 0.1 \text{ V}_{p-p}$ TRIG: TP4/DM-54A(R-5)	RV101/BC-11A(B-6)

13-2. CHARACTER SIZE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Indicate the ITEM No. 104, TITLE (LARGE) in the Dial Menu Operation on the screen. (Refer to Section 1-6) • Extend the TC-51 Board by using the EX-127 Extension Board. • Play back the color-bar segment of the alignment tape RR5-1SD.	Balance the characters  The diagram shows a rectangular monitor screen. Inside the screen, there is a smaller rectangle. On the left side of the inner rectangle, there is a horizontal double-headed arrow labeled 'A'. On the right side of the inner rectangle, there is a horizontal double-headed arrow labeled 'B'. Below the screen, the text 'A ≐ B' is written. A ≐ B	● CV1/TC-51(C-5)

